PMM

SEPTEMBER 1955

25th ANNIVERSARY

Precision Metal Molding

INCLUDING DIE CASTINGS MAGAZINE

EUGENE B POWERS OWNER
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devoted exclusively to:

DIE CASTINGS

INVESTMENT CASTINGS

PERMANENT MOLD CASTINGS

PLASTER MOLD CASTINGS

POWDER METALLURGY

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ALUMINUM ALLOYS

- All alloys are quality controlled. Free from impurities and gas.
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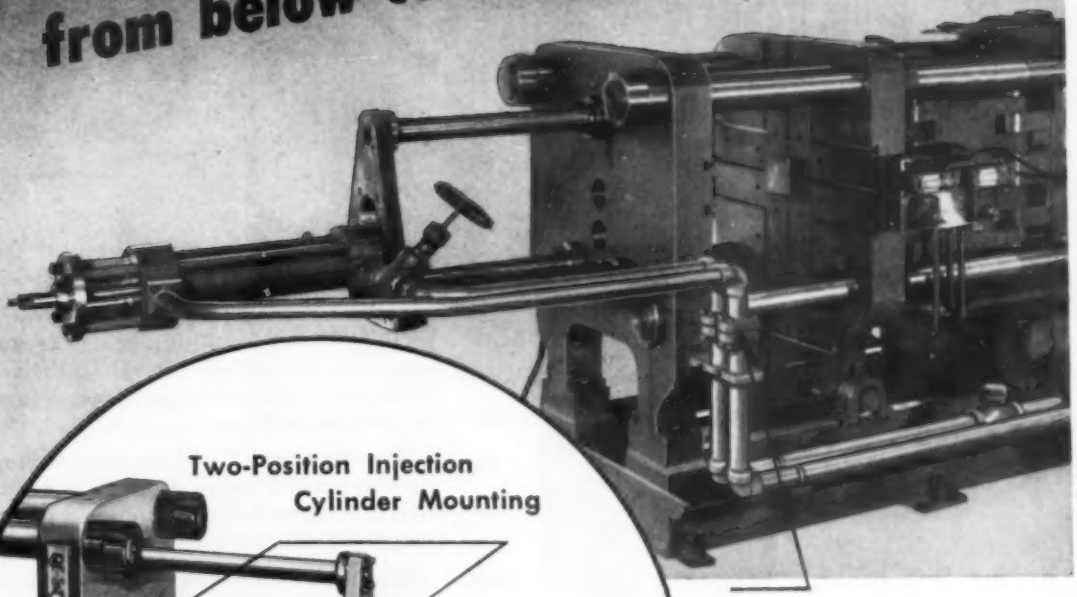
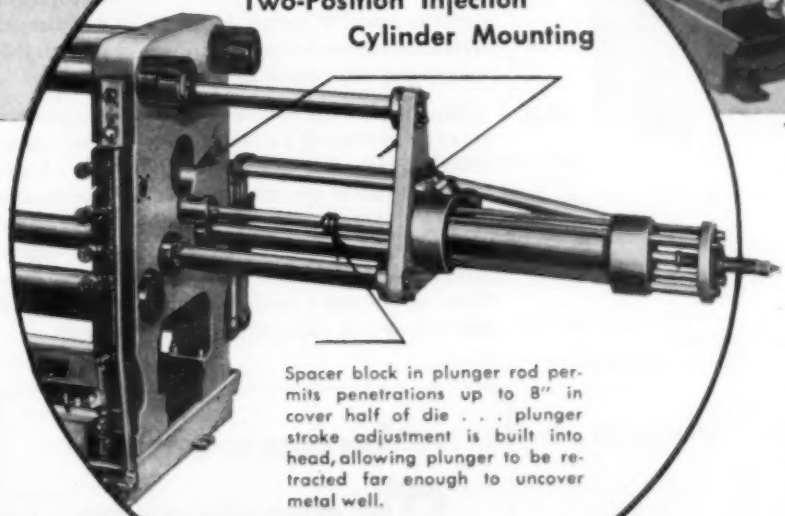
Another CAST-MASTER BONUS feature

FAST, EFFICIENT CHANGE-OVER from below center to center shot!



Two-Position Injection Cylinder Mounting



Spacer block in plunger rod permits penetrations up to 8" in cover half of die . . . plunger stroke adjustment is built into head, allowing plunger to be retracted far enough to uncover metal well.

When changing from below center to center shot, simple addition of extra section of pipe eliminates the use of hose or flexible tubing, thereby affording an extra measure of safety.

In modern production, time means money. That's why leading die casters praise the exclusive features shown here, which permit rapid change-over without sacrificing safety. To learn about other Cast-Master "bonus" features, send for the new, complete catalog giving illustrations and specifications on eight great new models.

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Diesel Heavy-Duty Piston

Aircraft Piston

"M" Tractor Piston

Steel-Belted Piston

OVER 50 YEARS of making precision parts for the automotive and aircraft industries . . . has given Thompson engineers opportunities to improve on many methods and materials.

"Creative Casting"—a Thompson development—makes possible the use of metals that withstand high temperature—that are strong—that are lightweight and can be cast to very close tolerances.

Whether it's a piston for an airplane, a passenger car, a heavy-duty truck or tractor engine—gasoline or diesel—you'll find that Thompson's Light Metals Division can make it better. Thompson's famous STEEL-BELTED PISTON is one example of a Thompson FIRST that gives better engine performance in cars, trucks, buses and tractors. Write or call and a competent representative will call to help you solve your piston problems.

For a detailed description of the Thompson Light Metals Division operations, send for your free copy of "Creative Castings". "Steel Belted Pistons", detailing this Thompson development, is also available. Just write, on your company stationery, to Dept. PM-6 Light Metals Division, Thompson Products, Inc., 2269 Ashland Road, Cleveland 3, Ohio.

You can count on Thompson Products

LIGHT METALS DIVISION

2269 Ashland Road Cleveland 3, Ohio

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PMM

Sept. 1955

Volume 13 Number 9

Precision Metal Molding

DIE CASTINGS
INVESTMENT CASTINGS
PLASTER MOLD CASTINGS
PERMANENT MOLD CASTINGS
POWDER METALLURGY
SHELL MOLD CASTINGS

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FEATURE ARTICLES

39 **25 YEARS**

41 **1955: DIE CASTING'S BIGGEST YEAR.** Now, what about 1956?

42 **METAL SUPPLY.** More metal is needed to meet anticipated demand.

44 **DESIGN TRENDS.** Survey of designers and buyers shows most new products will include die castings.

47 **TOMORROW'S DIE CASTINGS:** Some new products including die castings.

54 **DIE CASTING MACHINES.** Hot Chamber Machine Sales Nearly Double.

56 **TRENDS IN EQUIPMENT.** Some new developments in the offing.

59 **AMERICAN DIE CASTING INSTITUTE** 27th Annual Meeting.

61 **WHEN YOU BUY INVESTMENT CASTINGS.** These basic suggestions will be helpful.

63 **CASTER WHEELS** — Cast Iron or Powdered Iron?

100 **INVESTMENT CASTING INSTITUTE AWARD**

109 **CONTINUOUS MELTING AND AUTOMATIC POURING.** New furnace points toward automatic foundry.

FINISHING SECTION

67 **FINISHES FOR DIE CASTINGS.** Some new developments and trends.

70 **PRECISION FINISHING IN A BARREL.** A round-up of methods and procedures for barrel finishing.

REGULAR DEPARTMENTS

6 Letters to the Editor
9 Between the Lines
16 Data in Ads
21 Casting About
28 Recent Patents
34 News About People
78 Useful Literature
82 New Products
99 Opportunites
115 Industry News

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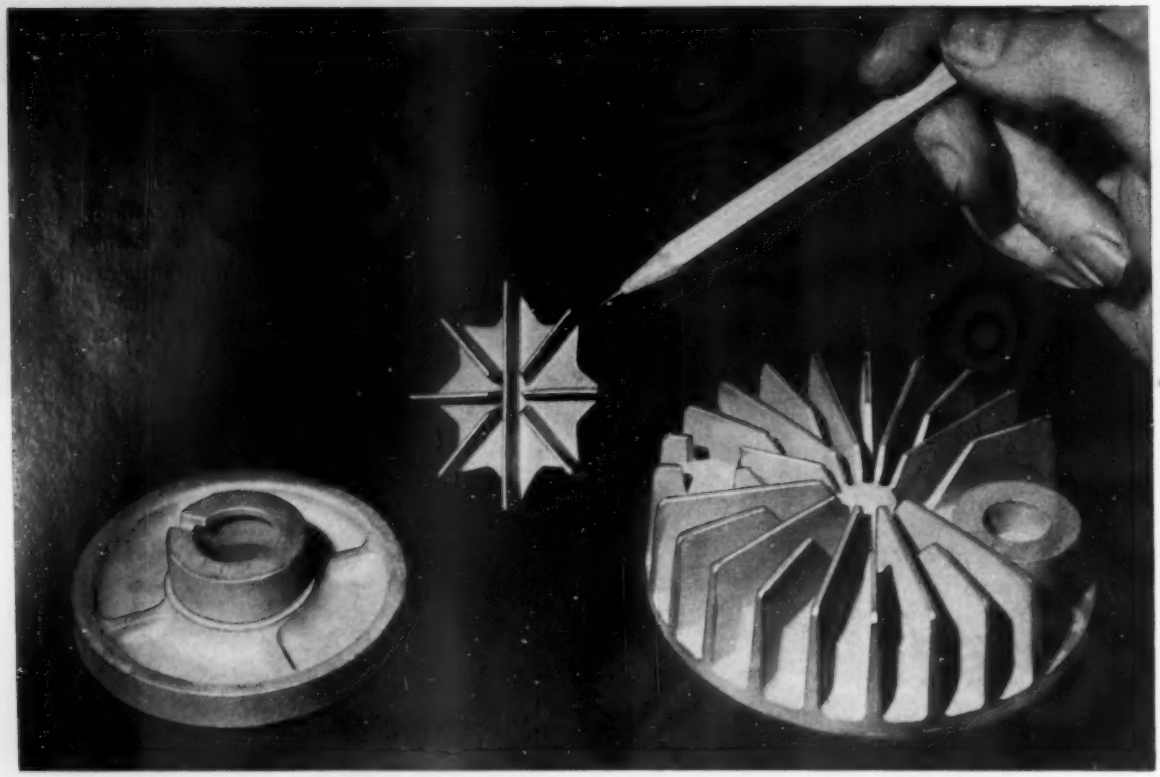

Spins in salt water—Pencil points to "PITLOG" impeller that spins in salt water at 6000 RPM. All three parts are Monel precision castings made by Inco for Pitometer Log Corporation, New York City.

With Inco Precision Casting, precision-balanced *impeller*

needs no milling, little hand filing

These parts go into a "sea speedometer." It's a Pitometer Log that translates water velocity under a ship into knots. And when you remember how corrosive fast-moving salt water is, you know why the parts are made of Monel®.

For the Monel castings, the people who make "PITLOGS" called on Inco's "know-how" with nickel alloys.

Inco *precision* casting cut machining time 30%

That's a round figure for all three parts. The time-saving is nearer 50% in machining the intricate ribbed cover you see at right. Inco precision casting also enabled "PITLOG" engineers to redesign this part. Reduce its wall thickness. Improve its geometry. Minimize scrap.

Previously, when the center impeller was sand cast, "PITLOG" machinists had to mill the ribs. And they had to hand file the webs between the ribs to balance the impeller. *Inco precision casting eliminated all milling.* It reduced the hand filing appreciably, too.

Where can you save with Inco precision casting?

Do you have a part which is 6 inches by 5 inches or smaller? Does it weigh under 3 pounds? Require starting tolerances as close as plus or minus .005 inch per linear inch? And need 5 or more fabrication steps? If so, there's a good chance you can cut cost and improve design by having the part precision investment cast by Inco.

Inco precision casts most high-melting point alloys from carbon steel to the new super alloys.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

5 Advantages of INCO Precision Casting

- Save up to 60% of production costs.
- Longer life with harder alloys.
- Little or no machining required.
- Wider design latitude.
- Higher alloys at lower cost.

Get This Helpful New Booklet

Trying to keep costs in line on some small part? Then write for new 16-page booklet, "Cast to Outlast." Contains many case histories detailing how others cut costs with Inco precision castings. There is a good chance this helpful data will suggest a practical way to cut your costs, too.

Inco Castings

Precision · Sand · Centrifugal

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Plenco research produces better resins for

better shell molding...

When shell molding was introduced to this country in 1947, Plastics Engineering Company was quick to realize the great potential of this new process. A laboratory was equipped to manufacture shell molds, special machinery was designed and fabricated and an intense research program was launched. The results of this research and the experience gained is available to you at your request.
Write or call and one of Plenco's engineers will give you whatever technical advice and assistance is necessary to help you solve any plastics problem you might have.

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Sheboygan, Wisconsin

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FOR BETTER PLASTIC PRODUCTS

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this manufacturer planned for die-casting savings...

SCOTCH BAG SEALER built for Minnesota Mining and Manufacturing by Specialty Manufacturing Co. Die castings by Twin City Die Castings Co.

here's how
TWIN CITY DIE CASTINGS
helped SPECIALTY MFG. COMPANY make die-casting pay better!

Specialty Manufacturing Company planned this Bag Sealer for die-casting from the start. Working closely with Specialty engineers, Twin City Die Castings Company developed dies and cast the two side plates, tape drum, spring cap and mounting plates. Thorough-going cooperation in planning for die-casting, made possible the utmost in die-casting efficiency . . . *plus* reduced designing costs and production lead time.

When you plan your product for die-casting by Twin City, you avoid false starts and costly design changes. Frequently it is possible to develop dies which eliminate machining operations while improving the product—you get *higher* quality and *greater* salability at a *lower* per-unit cost.

Get the facts for yourself! Find out how you can save by planning your product for die-casting by Twin City—oldest and most experienced die-casters in the Upper Midwest. Your letter or phone call will receive immediate, executive-level attention.

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3351 TALMAGE AVE. S.E. • MINNEAPOLIS 14, MINNESOTA

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SOURCES WANTED

Can you recommend a company that can produce die castings or their equivalent on a short run basis, for example, for experimental samples or pilot runs? I remember an advertisement that appeared in your paper some time ago but I cannot locate it now and don't remember the company.—A. S. (Chief Engineer).

We would appreciate it if you could furnish us with the names of suppliers of shell molded castings in cast iron or ductile iron.—M. W. M. (Design Department).

Kindly forward the names and addresses of precision investment casters and die casters of stainless steel in the New York, New Jersey, Connecticut areas.—R. R. (Purchasing Agent).

We would appreciate it if you could supply us with the names of pattern makers who are capable of producing accurate patterns for plaster molding.—I. I.

Kindly let me know whether there are regular exhibits in this country of die cast products, organized on a national or on a local scale. Exhibits of this kind are held annually in Great Britain.

My principal in Belgium is interested in studying the adaptation to his own market (Benelux and neighboring territories, also Belgian Congo) die cast products of new designs or for new applications. Are such die cast products available?—L. R. (Technical Consultant)

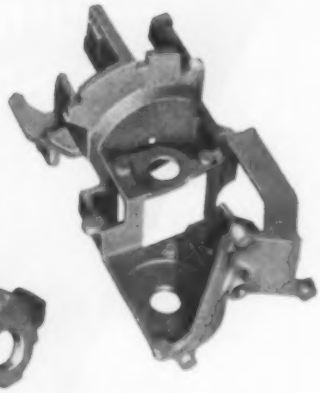
On page 29 of your July issue you have an article about Vacuum Die Casting.

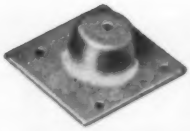
We should like to learn more about this process. Can you give us more information, or tell us where we can get it?—A. J. W. (President)

Can you recommend anyone who manufactures household articles and novelties made from die cast aluminum? We are particularly interested in obtaining catalogs on kitchen gadgets and

Continued on page 91

What's *your* need in DIE CASTINGS





WHATEVER YOUR NEED . . . CALL ON

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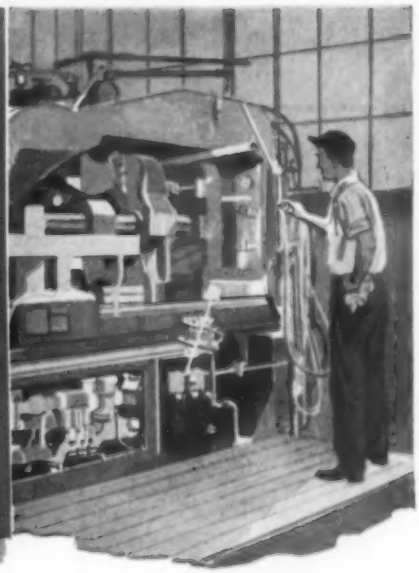

No matter how complicated your die castings are . . . no matter what their size or shape . . . chances are that you can get better quality and faster service by dealing with us.

You save time and money with Bendix Foundries. We have a quarter century of specialized experience in the production of high-precision castings . . . of *all* magnesium and aluminum alloys.

You get what you want with Bendix Foundries. We utilize the most advanced service, methods and equipment . . . including resident government inspectors and complete metallurgical and X-ray laboratories.

If ability to produce quality castings in a wide range of sizes, shapes and varieties . . . and in production or made-to-order lots . . . interests you, write us for full details.

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Check-Chart Shows Versatility of Bendix Foundries

PROCESS USED	METAL WORKED	
	ALUMINUM	MAGNESIUM
Sand	√	√
Plaster	√	√
Shell Mold	√	√
Die	√	√
Permanent Mold	√	√

FREE . . . "Book of Facts"!

Please send me your "Book of Facts" on magnesium and aluminum castings.

Name _____

Title _____

Company _____

Street _____

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State _____

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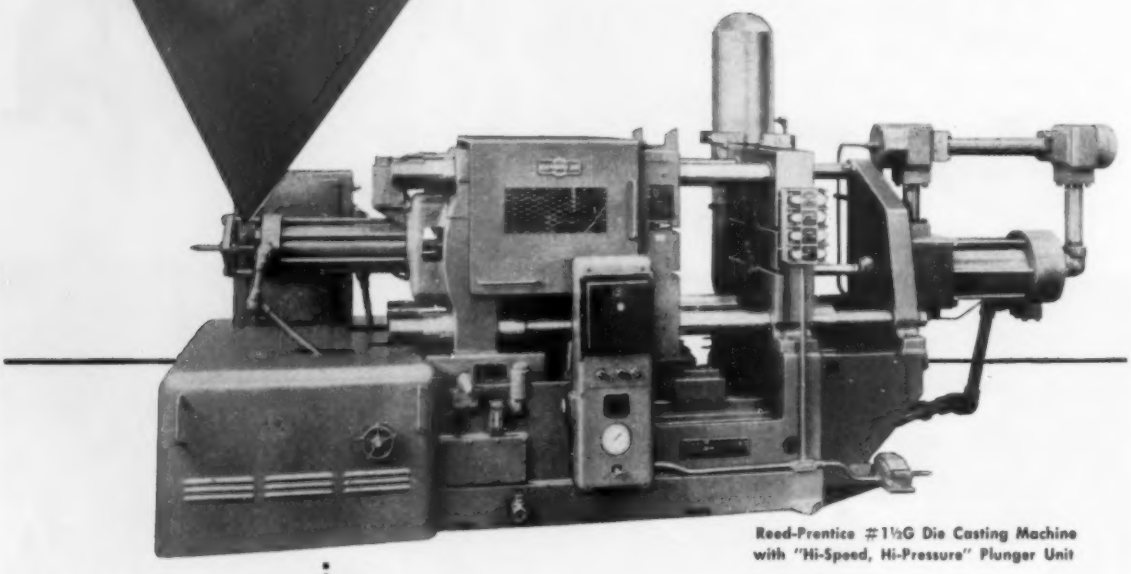
adjustable die stroke



Reed-Prentice #1½G Die Casting Machine with "Hi-Speed, Hi-Pressure" Plunger Unit

free

Write for complete specifications and information on REED-PRENTICE die casting machines.

NOW REED-PRENTICE DIE CASTING MACHINES OFFER YOU Shorter Cycle Time, Higher Output

Here's a way to cut the time of each machine cycle where a full die stroke is not required. With this newest REED-PRENTICE feature, the adjustment for running thin dies is quick and easy. On Models #1½ and #1½G, the stroke adjusts from 6¼" to 10¼"; on Models #2 and #2G, from 8" to 14"

The #1½G die caster is shown above with the new adjustable die stroke mechanism and optional "Hi-Speed, Hi-Pressure" plunger that produces extra-dense, porosity-free castings.

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BETWEEN THE LINES

THE BREAK-EVEN POINT for converting rough gray iron castings to powdered iron parts seems to lie somewhere in the neighborhood of the one-pound piece. A couple of years ago PMM conducted a market research study which revealed that about 400,000 tons of small gray iron castings, (one pound and under) on which extensive secondary operations are performed, were "naturals" for the precision metal molding processes. Now, ten years experience in turning out casters for floor trucks by powder metallurgy seems to bear out this estimate. In this issue is a detailed study of the experience of The Bassick Company in its conversion of casters under 3-inch diameter (approximately one pound) from gray iron to powdered iron.

TAKING IT OFF can be as expensive as putting it on. The methods of applying electroplated coatings to zinc die castings are quite well known, but the methods of salvaging castings where the plate is defective may not be as generally understood. A safe, fast and inexpensive method of stripping plate will be reported in the next issue of PMM.

IT'S CHEAPER BY THE BARREL . . . Finishing, that is! The obvious advantage of bulk processing of die cast parts in a barrel is the tremendous saving in labor which is unquestionably the biggest hunk of your finishing expenditure. Scientific methods have been developed for barrel finishing, and it is no longer a random tumbling action, as practiced in today's metal working plants. PMM gives a complete report on this method for finishing die castings, together with some recommendations on making the trial run, do's and don't's, and case studies. It begins on page 70.

VACUUM: NEW METAL WORKING TOOL. We are impressed with the rapid development of vacuum techniques for various metal working operations. Within the past several years, it has become an important tool for improved processing. Vacuum is now used for: 1) finishing, 2) melting, 3) casting, 4) degassing and 5) impregnating castings. That's a big order. Last month PMM reported on one vacuum die casting technique; next month you'll read about vacuum melting, especially as applied to investment casting. Within the past year we have had articles on vacuum coating and impregnation of die castings.

CONTINUOUS MELTING furnaces to supply a steady flow of molten aluminum for permanent mold casting, die casting, etc., is one of the latest developments in the modern foundry. A detailed report on the design, operation and importance of this development is reported in this issue starting on page 109.

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from A *to* Z

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METALLIC CADMIUM
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Enthonics **AT WORK** Protecting Zinc, Cadmium, Copper, Brass, Steel

ENTHONE CORROSION PREVENTIVES

Stand up to Salt Spray

At Enthone our sole aims are the development of better methods for the improvement of metal finishing and the reduction of finishing costs. These we have accomplished in the field of corrosion prevention. Our research chemists and engineers are responsible for the following outstanding metal finishing products for the prevention of costly corrosion:—

ENTHOX: Puts iridescent, gold-colored chromate coating on zinc and cadmium. An excellent base for organic finishes. Highly resistant to corrosion; withstands salt spray from 100 to over 1000 hours.

COMPOUND 39: A one-operation phosphating and cleaning compound for steel and zinc. Fine grained, highly adherent phosphate coat is ideal base for organic finishes. Gives high bond strength.

EBONOL "C": Gives jet black cupric oxide coating to copper and its alloys. Chemically stable; heat stable; very adherent. Fine base for organic finishes. Readily withstands salt spray.

COMPOUND NR-31: A rustproofing agent for iron and steel. Leaves thin surface film that prevents rusting when drying water off metal or when storing parts in water. Quickly removed by rinsing in water.

COMPOUND NR-37: An organic rust-inhibitive compound that prevents rusting while evaporating water from steel or iron following hot or cold rinsing. The compound evaporates as the water evaporates, leaving the surface ready for organic coating.

COMPOUND NR-40: A neutral degreasing and rustproofing compound for iron and steel. Imparts light, corrosive-resistant film. Cleans, temporarily rustproofs in one operation. Excellent for hot water drying of steel.

RUSTPROOFING OIL NO. 15: A polar solvent-type rustproofing oil that leaves thin film on metal. Safety solvent with flash point well over 100°F. Completely sheds water. Has a salt spray resistance of 15 to 24 hours.

RUSTPROOFING SOLUBLE OIL: An emulsifiable, rustproofing material. Corrosion-resisting oil film is created by diluting oil with water. Protects steel against rust for 10 to 15 hours in salt spray.

ENTHONE Chemical Products are formulated to meet specific metal finishing needs. Consult any one of our field representatives or write our research department regarding your finishing problems. They will gladly tell you about the ENTHONE products designed to fit into your production picture — offering operational savings, improved product performance and increased production efficiency. Write today for an obligation-free consultation.

**The Scientific Solution of Metal Finishing Problems.*

ENTHONE INCORPORATED

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ELECTROPLATING CHEMICALS

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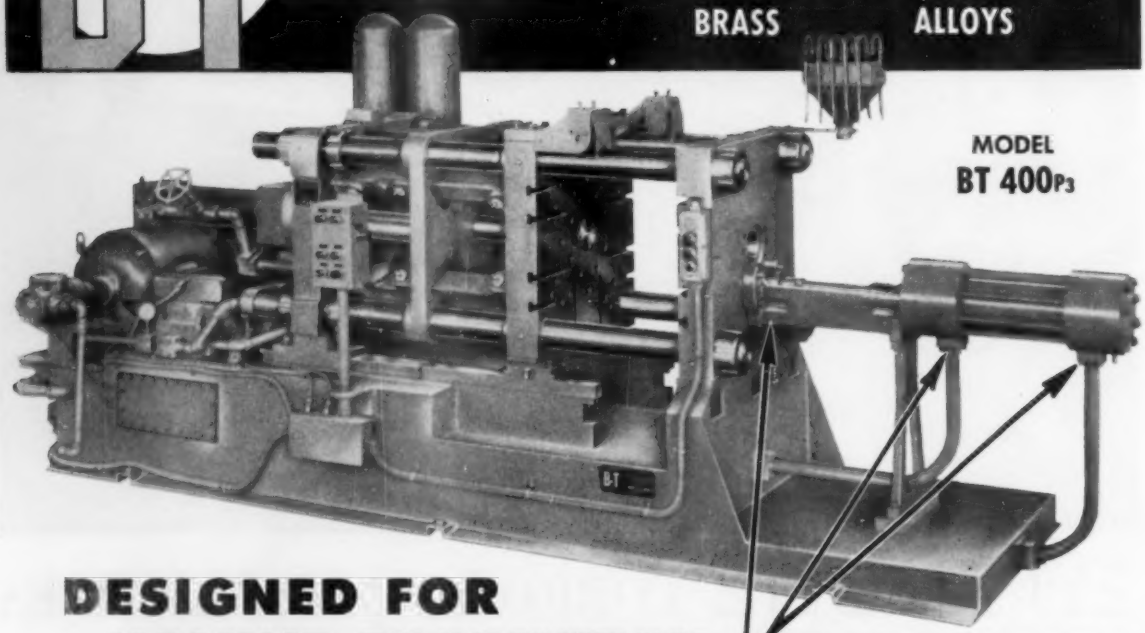
Presents

A HIGH PRESSURE COLD CHAMBER DIE CASTING MACHINE, FOR ALUMINUM MAGNESIUM OR BRASS ALLOYS



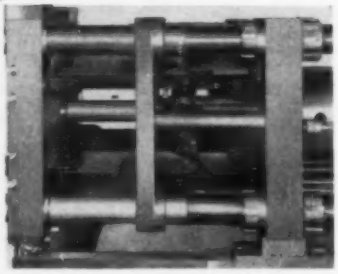
MODEL
BT 400P3

DESIGNED FOR VOLUME PRODUCTION

Equipped with 2000 Lb. P.S.I. Hydraulic System acting as an intensifier, working in Direct conjunction with the discharge from the accumulator.

Change over from below center to center by simple addition of extra spacers.

Supporting Bars above Cold Chamber eliminated, providing free access to Cold Chamber. Perfect alignment assured as entire unit is rigidly supported by recess in front plate.



Four Toggles locking directly under the Bars assures positive locking and alignment.

Write or telephone for complete specifications of this Model and our complete line of both Zinc and Cold Chamber Machines in both larger and smaller Models.

Phone WOodward 5-3140

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112 MADISON AVE. • DETROIT 26, MICHIGAN
PLANT: 201 WEST 8TH STREET, HOLLAND, MICHIGAN

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How can you use Monarch's new
vitreous enameled aluminum castings
to improve your products?

Here is a revolutionary new finish—pioneered by Monarch—for users of aluminum castings. Could this be your solution to problems involving colorful sales appeal and surface protection? Certainly such an outstanding new development is worth your investigation.

From housewares to hardware—industrial equipment to home appliances, vitreous enameled aluminum castings offer many new advantages—new uses. For specific information write for Monarch's new brochure—"*Vitreous Enameled Aluminum Castings*".

MONARCH ALUMINUM MFG. COMPANY—9205 DETROIT AVENUE—CLEVELAND 2, OHIO
MANUFACTURERS OF *Aluminum Permanent Mold Castings • Zinc Die Castings • Aluminum Die Castings*
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EXPERTS AGREE "DO-IT-YOURSELF" FINE FOR HOME, but UNSUITABLE FOR INDUSTRY

It is the consensus of experts that the "Do It Yourself" trend is a fine thing for hobbyists, but in industry it can be uneconomical and inefficient.

This makes sense. When it comes to something technical and precise, such as a tiny component of a product, no one can do the job as well as an expert.

And when it comes to tiny die cast parts, no one can do the job as well as Gries. This is because Gries specializes in the precision molding of die cast zinc alloy tiny parts. GRC has unique machines which produce simple or intricate parts—even movable multiple-element assemblies—*in one automatic operation*. This completely automatic production is fast and economical.

Many manufacturers, seeking to cut down overhead and achieve the most efficient operation, have found that the specialized services offered by Gries save them time and money, and give them parts which perform better because they are made better.

GRC SOLVES TOUGH PARTS PROBLEM

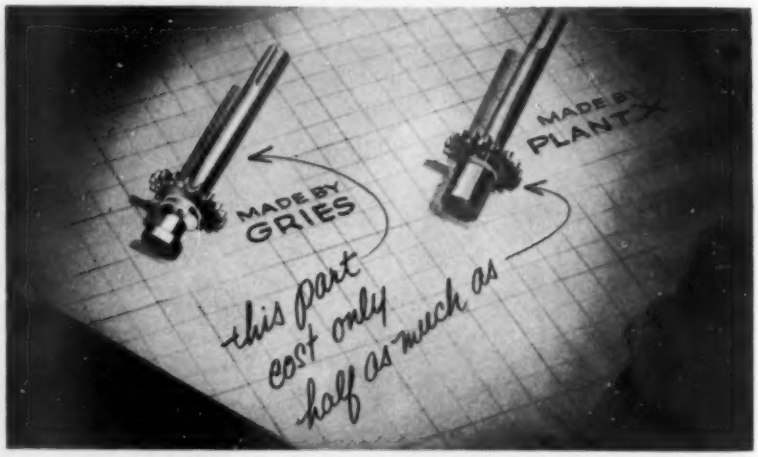
Even the most hard-to-make parts—parts that are too difficult for conventional die casting — can be produced by Gries' methods. Intricate shapes and involved contours are possible in one continuous operation.

This gives design engineers unlimited latitude in planning products which use small parts. It decreases the number of operations often completely eliminates machining and assembly work. Unlike other methods, there is no scrap loss.

GRIES OFFERS INFORMATIVE DIE CASTING BULLETIN

Write, wire or phone today for your copy of Gries' fact-filled Die Casting Bulletin. It gives specific information which will show you how Gries can help you with your small parts problems. Send prints for quotations.

For example, cost and delivery comparisons prove that Gries can die cast tiny parts more economically and more efficiently than most "captive" plants.



Gries-made SLOTTED GEAR SHAFT for range timer, at left, cost half as much as duplicate, made by Plant "X", at right, needs no secondary machining operation, and can be used in a number of applications, allowing large quantity purchases.

EXCLUSIVE PRODUCTION FACILITIES OFFERED BY GRIES

At the modern Gries plant in Westchester County, New York, production facilities are geared to turn out quantities of 100,000 to many millions, completely trimmed and degated, ready for use. Smallness is unlimited: maximum weight ½ oz., maximum length, 1¾ in.

Gries also has full facilities for secondary operations such as tapping, drilling, assembling, reaming, special machining and surface finishing. Practically all commercial finishes can be applied to GRC zinc alloy die castings.

GRIES' TINY MOLDED PLASTIC PARTS DESCRIBED IN NEW BULLETIN

In addition to die casting tiny parts, Gries also molds all thermoplastics—Nylon, Kel-F, acetates, polystyrene, polyethylene, etc. A new bulletin is now available giving details of Gries' simplified methods for automatic injection molding and exclusive insert molding.

This bulletin describes how the unique techniques developed by Gries make possible tiny plastic parts to precise size and design specifications. You may find that Gries plastic parts are the answer to your production problems. Send for your copy of the Gries Plastics Molding Bulletin *TODAY*.

WORLD'S FOREMOST PRODUCER OF SMALL DIE CASTINGS

GRIES

GRIES REPRODUCER CORP.

157 Beechwood Ave., New Rochelle, N. Y. NEw Rochelle 3-8600

For more information circle No. 37 on the Reader Service Card

For die casting and permanent MOLDING of •Aluminum or •Copper Alloys

USE CRUCIBLES *for* MELTING *and* HOLDING

Here's why...

For "cold chamber" die casting and permanent molding, melting and holding the metal in crucibles is preferred because of lower cost, better regulation and "crucible" quality metal.

Crucibles are easier to clean and keep clean. There is less build up of aluminum oxide and dross and no penetration of the crucible wall. Iron contamination is completely eliminated.

Automatic temperature control is readily maintained.

Gas or oil fuel used with crucibles provide the lowest available heat cost.

Crucible furnaces may be shut down over night or during non-working periods without any fuel consumption or supervision.

Battery of "ladle-out" crucible furnaces in a permanent mold foundry. Working capacity each furnace, 300 lbs. of aluminum.

Photo courtesy The Campbell-Hausfeld Co., Harrison, Ohio

THESE FIRMS CAN TAKE CARE OF ALL YOUR REQUIREMENTS FOR CRUCIBLE MELTING.

LAVA CRUCIBLE-REFRACTORIES CO.
AMERICAN REFRACTORIES & CRUCIBLE CORPORATION
JOSEPH DIXON CRUCIBLE CO.
VESUVIUS CRUCIBLE CO.
ELECTRO REFRACTORIES & ABRASIVES CO.
ROSS-TACONY CRUCIBLE CO.

Have you seen the new " 'CRUCIBLE CHARLIE' says . . ." leaflets issued by Crucible Manufacturers Association? If not, ask your superintendent about this. He has a copy.

Crucible Manufacturers' Association

THE LORD'S COURT BLDG., WILLIAM ST., NEW YORK 5, N.Y.

For more information circle No. 24 on the Reader Service Card

DATA OFFERED IN THIS MONTH'S ADS

to get any of the free materials described here, circle the appropriate number on the reader service cards bound into this issue

2. DRY FILM LUBRICANTS that reduce rejects, increase mold life, and decrease lubricant consumption are described in Reprint DC and bulletin No. 425-R10 from Acheson Colloids Co.

7. ALUMINUM ALLOY designed specifically for die casting is fully described and the as-cast mechanical and physical properties together with the chemistry given in specification sheets on alloy Z-39 from Apex Smelting Co.

8. TECHNICAL DATA, free samples and descriptive literature on the fluxes for zinc die casting alloys can be secured from Atlantic Chemicals & Metals Co.

9. PISTON RINGS & plunger rings for die casting machines are discussed and the available sizes in different materials listed in data sheets from Auto-Diesel Piston Ring Co.

10. BRONZE PERMANENT MOLD castings that offer outstanding advantages to the design engineer are fully discussed and all pertinent data given in the new catalog from Alcaloy, Inc.

12. LOW COST-HIGH SPEED die casting machines with many new and improved features are described in the American Die Casting Machinery Co.'s illustrated folder.

14. MONTHLY LETTERS, metals bulletin and historical blotter series are offered by Belmont Smelting & Refining Works, Inc.

16. SWIVEL JOINTS for moving hydraulic cylinders are described and the different types and sizes listed in bulletin 265A from Barco Mfg. Co.

17. DIE CASTING MACHINES, both hot and cold chambers are completely described in literature from B & T Sales Co.

18. STANDARD AND SPECIAL ALLOYS designed specifically for remelting in the investment casting industry are listed and described in the new Cannon-Muskegon Corp. catalog.

19. FIRE RESISTANT HYDRAULIC fluids of the Ucon-Hydrolube type are discussed in a new booklet, form 7380, available from Carbide & Carbon Chemicals Co.

20. DIE CASTING MACHINES that feature a fast change over from center to below center shot are described and illustrated in the Cast Master, Inc. catalog.

21. UNIVERSAL HYDRAULIC die casting machine for use with any die castable metal is described in literature on the new model 400-N machine made by Cleveland Automatic Machine Co.

22. FOR ENGINEERING AND PRODUCTION executives, a new brochure has been issued by Cleveland Tool & Die Co. that describes the facilities of the company, including equipment for making powder metal dies.

24. "CRUCIBLE CHARLIE SAYS"—a publication of the Crucible Manufacturers Association will help foundry men to select the proper crucible for the job and then get the greatest life from it.

25. "DIE CASTING SMALL PARTS" is the title of a new booklet that has been published by the DCMT Sales Corp. The die casting process and the die casting package are both fully explained.

26. EJECTOR PINS and other standard die-set components are listed and illustrated in the Detroit Mold Engineering Co. catalog.

30. THE BOOK OF FACTS published by Eclipse-Pioneer Div. of Bendix discusses aluminum and magnesium die castings, their manufacture and application.

32. DRY HEARTH MELTING FURNACES adapted for heating with either gas or liquid fuel are described in bulletin C-80 from Eclipse Fuel Engineering Co.

35. METAL WORKING LUBRICANTS for die casting, machining, etc. are featured in bulletins available from Fiske Bros. Refining Co.

36. ASSEMBLY BY DIE CASTING on a Fisher Gauge Works, Ltd. model 15 machine is the subject of descriptive literature and data sheets that have been published. Assembles shaft on gears, etc.

40. SPECIFICALLY DESIGNED to do the particular job required, furnaces by Harper Electric Furnace Corp. are custom built. For a pictorial review of specially designed furnaces ask for the Harper bulletin.

41. ZINC & ALUMINUM fluxes specially compounded for die and permanent mold casting are described in bulletins from Haviland Products Co.

42. SELF PALLETIZATION of zinc alloy for easy handling and lower shipping costs is described in a brochure from Henning Bros. & Smith.

44. BETTER DIMENSIONAL CONTROL, cleaner castings, negligible scrap are claimed for castings made on the new Hydraulic Press Mfg. Co.'s die casting machines. Bulletin 5400 tells about them.

45. DEBURRING & FINISHING with abrasive belts is the subject of a 20 page booklet that has been issued by Hammond Machinery Builders, Inc.

47. "CAST TO OUTLAST," is the title and subject of a new 16 page booklet on investment casting that has been issued by International Nickel Co.

49. POWER PRESSES for trimming, forming, coining, etc. are fully described and all pertinent data on them given in bulletin 1955 from the Johnson Machine & Press Corp.

50. DIRECT CASTING of investment castings with a Detroit furnace is discussed in a bulletin on type IC units from Detroit Electric Furnace Div., Kuhlman Electric Co.

51. DIE CASTING machines of advanced design to give dense, close tolerance, hardware finish castings are described in the illustrated Kux Machine Co. catalog.

52. AN ALL NEW series of die casting machines has been announced by Lake Erie Engineering Corp. Full descriptive literature on these new machines will be sent as soon as available.

53. DESIGN INFORMATION on die castings to make your product better and less costly is available from Litemetal Dicast, Inc.

54. A NEW 600 TON die casting machine has been announced by Lester-Phoenix, Inc. Detailed information on this new machine is available.

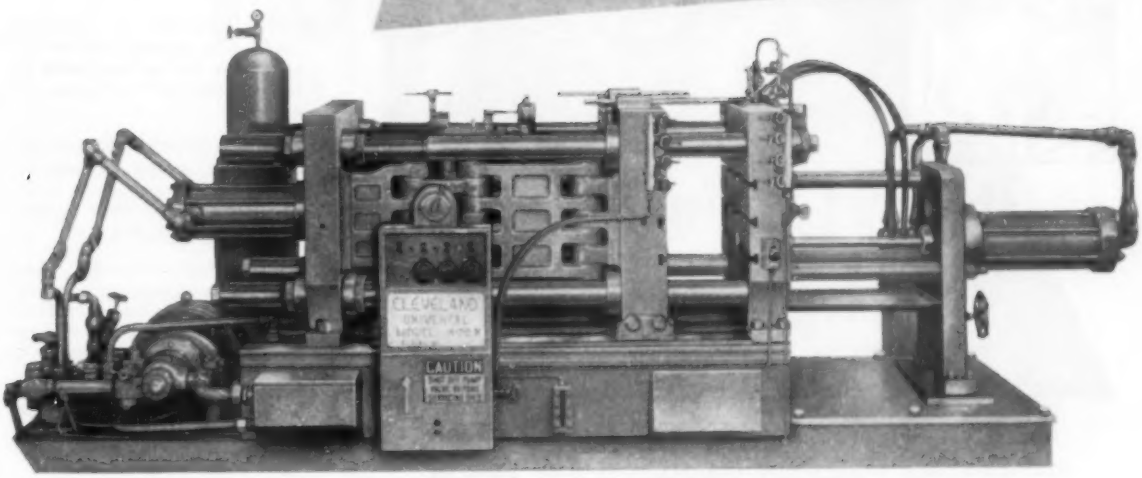
55. NON-FERROUS MELTING furnaces of two chamber design maintain clean, dross free metal on the dip out side to give sounder castings and lower rejects. Bulletin 560 from Lindberg Engineering Co. describes these furnaces.

Continued on page 18

Meets *ALL* your requirements

for *PROFITABLE* die casting!

Cleveland Model 400-N
shown with cold chamber end.



The CLEVELAND model 400-N
Hydraulic Universal Die Casting Machine

Here are the features of the Cleveland Model 400-N that will give you better castings, faster, at less cost:

- Massive, rigid construction throughout for dependable, economical performance.
- Powerful die locking pressure — 400 tons, strain gauge tested.
- Rapid, smooth die closing and opening for high production operation.
- High metal injection speeds to produce sound, dense, hardware finish castings.
- Safe, simple control—manual or automatic.
- Ample room for die mounting, for operation and maintenance.
- Universal construction — easily convertible for either hot or cold chamber operation.

To get the most from your die casting department —in speed of production and quality of castings —investigate the many advantages of the Model 400-N Cleveland. Let the Cleveland sales engineer in your area show you how the Model 400-N can improve your die casting production with money saved . . . or write direct for full details.

REMEMBER, CLEVELANDS CUT COSTS

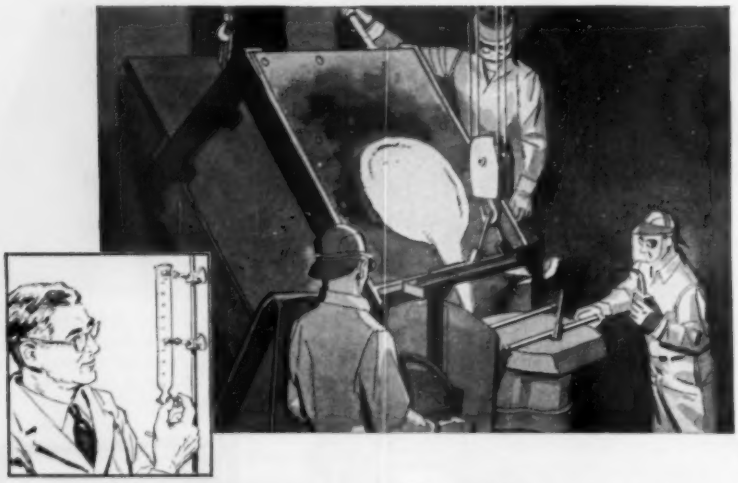
THE CLEVELAND AUTOMATIC MACHINE COMPANY

4952 Beech Street
Cincinnati 12, Ohio

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

For more information circle No. 21 on the Reader Service Card



It pays to insist on

MASTERMET CERTIFIED ALLOYS

STAINLESS • HIGH TEMPERATURE • SPECIAL ANALYSIS

Make Cannon-Muskegon your source of custom and standard high alloy metals — and be sure of exactly predictable metallurgical control

NO matter what alloys you use, it pays to have the exact physical, chemical and electrical characteristics you want. That's why the leading firms in your industry insist on MasterMet certified alloys. With each heat, you receive a notarized analysis as a guide for remelt or processing. And, close laboratory control assures constant uniformity to one or more heats of the same alloy.

Look into the great versatility of Cannon-Muskegon's complete MasterMet alloy service — and the opportunity it affords for improving present quality, for experimental or new production. MasterMet alloys are available in shot, ingots and cast billets, bars and special shapes.

Typical Regular-Production Alloys Certified for Scores of Applications

STAINLESS STEELS	SUPER ALLOYS	ALLOY STEELS	SPECIAL ALLOYS	
	High Temperature			
300 SERIES	AMS 5382B	SAE 4130	*NI RESIST	CU-NI
400 SERIES	AMS 5385B	SAE 52100	*MONEL	NI-CR
ACI TYPES	AMS 5388	SAE 6150	*INCONEL	NI-FE
17-4-PH†	PWA 651A	SAE 8630	INVAR	CR-FE
		SAE 3140	TOOL and DIE STEELS	

†ARMCO Steel Corp. *International Nickel Co.

Cannon-Muskegon
CORPORATION

2871 LINCOLN STREET • MUSKEGON, MICHIGAN

Cannon-Muskegon is your only source of MasterMet certified alloys — that's why it pays to have the complete story. Write for NEW catalog today.

MASTERMET
CERTIFIED ALLOYS FOR INDUSTRY

For more information circle No. 18 on the Reader Service Card

DATA IN ADS
continued from page 16

59. VITREOUS ENAMEL on cast aluminum is now possible by the new Monarch Aluminum Mfg. Co. process. An illustrated brochure is available that describes the enamel and its properties.

60. ETHYL SILICATES for investment casting is the subject of a new technical bulletin that has been issued by Montrose Chemical Co. Samples are available.

61. SPECIFICATIONS & OPERATIONAL details of the Midwest Foster die casting machine are given in a bulletin that has been issued by Midwest Machine Co., Inc.

62. OFF THE SHELF stock sized bearings can save money in your assembly. National Molded Products, Inc. has available a list of these stock bushings to aid designers.

64. DIES BY HOBBING can reduce tooling costs. How, when and why to hob is told in a booklet from Newark Die Hobbing and Casting Co.

66. SAVE MACHINING TIME through the use of plaster mold castings in non-ferrous metals. Ohio Precision Castings, Inc. has a booklet that describes and illustrates where these castings may be applied.

68. DIES FOR BOTH die casting and permanent mold casting that will perform to specifications are discussed in a new reference catalog from Permanent Mold Die Co., Inc.

73. COMPLETE SPECIFICATIONS and detailed operational data on a line of die casting machines are given in a new brochure that has been published by Reed-Prentice.

74. FOR CLEAN METAL, melt under a flux. One or more of the complete line of fluxes from Rossborough Supply Co. will clean your metal, refine the grain, degas or deoxidize the melt. Complete information on this line of fluxes is available.

75. MACHINING ALUMINUM is the subject of a highly informative booklet that has been prepared by the engineering department of the Geo. Sall Metals Co., Inc.

80. MELTING NON-FERROUS METALS? The new Stroman Furnace & Engineering Co. catalog no. 900 describes the line of fuel fired furnaces and accessory equipment available.

Continued on page 20

WHAT THIS HEAT NUMBER MEANS TO YOU

An identifying heat number is marked on each heat of Zamak alloy produced by Henning Brothers & Smith, and is the key to complete records maintained for close quality control. Marked on each 2000-pound pallet of hot bars as they come off the casting conveyor, the heat number is recorded along with all pertinent information such as the furnace used, the spectrographic chemical analysis made on a sample taken from the furnace before casting, etc. It is your assurance that H.B.&S. Zamak alloy has been thoroughly checked at every stage of production, that nothing has been left to chance. This is your guarantee that every heat of alloy will be on-grade to meet your specifications.

Zamak bars, each stamped to identify the alloy, may be shipped on consumable skids of the same alloy at no extra cost. For full technical information on all alloys available, *Ask for Free Booklet*

HENNING BROS. & SMITH, INC.

91-113 Scott Avenue • Brooklyn 37, N. Y.

"DEPENDABLE SERVICE SINCE 1922"

For more information circle No. 42 on the Reader Service Card

DATA IN ADS
continued from page 18

81. AMORPHOUS TYPE SILICA with controlled pH and moisture content is described and all of its chemistry and properties given in specification sheets available from Tamms Industries, Inc.

82. "CREATIVE CASTINGS" the story of Thompson Products Light Metals Div. gives information for the designer and describes the casting facilities available.

83. BRASS DIE CASTINGS of superior finish and close dimensional tolerances are described and illustrated in a 12 page booklet from Titan Metal Mfg. Co.

85. DIE CASTINGS and where they can best be used in your product is told in literature from Twin City Die Castings Co.

88. INJECTION MOLDING machines for styrene patterns in the investment casting industry are completely described in brochures that have been issued by Van Dorn Iron Works Co.

91. BURNISHING MATERIALS specifically selected for any particular product can lower finishing costs. Abbott Ball Co. has prepared illustrated information sheets on burnishing.

92. CORROSION PROTECTION only or a brilliant finish, both can be secured with the proper Iridite finish. Allied Research Products, Inc. has technical data on these finishes.

93. BARREL FINISHING is the most economical method available where it can be properly applied. Almco has prepared literature that will help in selecting the proper barrel and the proper media for each job.

94. TUMBLING ABRASIVE properly selected as to type and size can lower finishing costs dramatically. The Exolon Co. has technical data available that will help to make the right selection.

95. SPRAY MASKS that can be used on manual, semi-automatic or automatic finishing machines are described in a 20 page booklet from Wm. M. Fiore Co.

96. THREADED INSERTS to put the stress and wear on steel instead of on a non-ferrous metal may make the difference in your design. The Groov-Pin Corp. has issued a descriptive folder that shows many typical applications of these inserts.

97. BARREL FINISHING equipment should be selected so as to do the best possible job at the lowest possible cost. The Grav-i-Flo Corp. has a complete catalog that lists all of their barrels and accessory equipment.

98. SCREW THREAD & screw lock inserts that are easily applied and last for the life of the equipment are described in literature from Heli-Coil Corp.

99. FIRE RESISTANT hydraulic fluid of the water base type can prevent costly losses when a hydraulic line fails. Get all of the facts about this material from E. F. Houghton & Co.

100. SUPER SMOOTH FINISHES on zinc and aluminum die castings are possible by barrel finishing with Honite "Micro Cut". Complete facts and figures have been published in a booklet by Minnesota Mining & Mfg. Co.

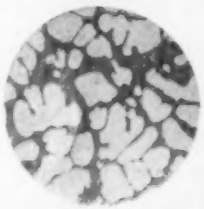
101. PAINTING ZINC DIE CASTINGS? The new Galvaprep is said to give superior adhesion of paint to zinc base castings. Bulletin 55-133 is a complete report on this material manufactured by Nielson Chemical Co.

Continued on page 97

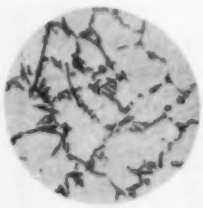
USE FLUX...
for Clean Metal, Sound Castings

for aluminum base alloys with 5% silicon or more

ROSSBOROUGH MOD-SIL PELLETS



150 X
WITH MOD-SIL
FLUX



150 X
WITHOUT FLUX

GIVES PROPER SODIUM PICK-UP, thus changing the solidification rate of high silicon aluminum alloys. Better elongation and tensile strength result. Porosity and associated notch sensitivity are greatly reduced.

other ROSSBOROUGH FLUXES:

B-11 Flux for Brass, Bronze and Copper
B-12 Flux for High Tin, High Lead Alloys
A-102 Aluminum Boiling Flux (for permanent mold work)
A-103 Aluminum Wet Flux (for running down borings or turnings)
A-104 Titanium Addition Flux
A-105 Magnesium Removal Flux
A-106 Aluminum Flux
A-107 Zirconium Addition Flux
A-108 Aluminum Hex Degasser
Z-21 Zinc Flux
MS Magnesium Shaker Compound (Permanent Mold)
MT Magnesium Topping Compound (Permanent Mold)
MR Magnesium Grain Refining Compound
Aluminum Permanent Mold Spray
Ladle Coat & Pot Wash
M-144 Magnesium Shaker Compound (Sand)
M-21 Magnesium Shaker Compound (Sand)
A-110 Aluminum Smelting Flux
A-112 Mod Sil Pellets
A-113 Titanium-boron addition
A-112 Super Degasser Pellets

Ask for technical information and your jobber's name.

ROSSBOROUGH SUPPLY CO.

Phone: Winton 1-6115
• 3376 West 137th Street • Cleveland 11, Ohio

For more information circle No. 74 on the Reader Service Card

CASTING ABOUT

NOVEL METHOD for producing refractory electrical contacts has been developed by an engineer with Gibson Electric Co. of Pittsburgh. The technique, for which a patent has been granted to George L. Williamson, Gibson sales manager, involves pressing powdered refractory material (tungsten, molybdenum or their carbides) into a briquette and, sintering. Then silver is placed in contact with one face of the briquette, and a weldable ferrous backing in contact with one face of the impregnating conducting material. When the assembly is placed in a furnace, the silver impregnates the refractory material and also bonds the back to the contact.

BRITISH DIE CASTING STANDARDS have been published jointly by The Institution of Mechanical Engineers and the British Standards Institution. The 28-page book provides a basis for good practice in design, production and inspection of zinc alloy pressure die castings. It is available from the B. S. I. at 2 Park St., London W1, England, for five shillings (70¢). According to a spokesman for the Zinc Alloy Die Casters Association, "For some time past it has been clear that the rapid expansion in the use of die castings in the engineering industry has warranted a standard which could ensure the reliability of zinc die castings for purposes where good mechanical properties and durability are important considerations. The new standard code of practice provides this much needed basis."

SAFE CONTROL VALVES for air cylinders, introduced by Hannifin Corp. to meet J.I.C. electrical recommendations, make use of die cast zinc solenoid covers. J.I.C. asked that these 3-way and 4-way valve units be inoperative if a maintenance man should remove a cover and fail to replace it. Besides meeting this requirement, the die cast zinc covers are gasketed so that the valve becomes splashproof and dustproof. Each cover is chained to the valve so it cannot be mislaid. It is held in place by four "captive" screws which do not fall out of their holes in the cover when loosened. In addition, there is a manual operating button at the end of each cover that can be operated with a screwdriver or even a pencil without removing the cover.

ADHESION-PROOF YOUR POTS . . . a new process called "Selinizing" has been announced which is said, by its developers, to eliminate the need for scrubbing, soaking or scouring kitchen utensils. The process is described as preventing food from sticking to metal surfaces; foods may be fried, boiled, baked or broiled in treated utensils without fats or cooking oils.

HOW TO USE DYE PENETRANTS for locating flaws in metals is the subject of a new, 23-minute motion picture available from Turco Products, Inc. The film, intended primarily for training purposes, visually demonstrates every aspect of dye penetrant inspections from lab theory to authentic production line techniques filmed on location. Included are actual production line inspection at Northrop Aircraft, Inc., Union Pacific Railroad, Sargent Engineering Corp., and Vulcan Pipe and Engineering Co.

Continued on page 25

SERVING INDUSTRIAL AMERICA

★ QUALITY
★ SERVICE
★ DEPENDABILITY

Manufacturers of
Aluminum Alloy Ingots
Zinc Alloy Ingots

ALLOYS & CHEMICALS
MANUFACTURING CO., INC.

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Cleveland 9, Ohio
ONtario 1-8600

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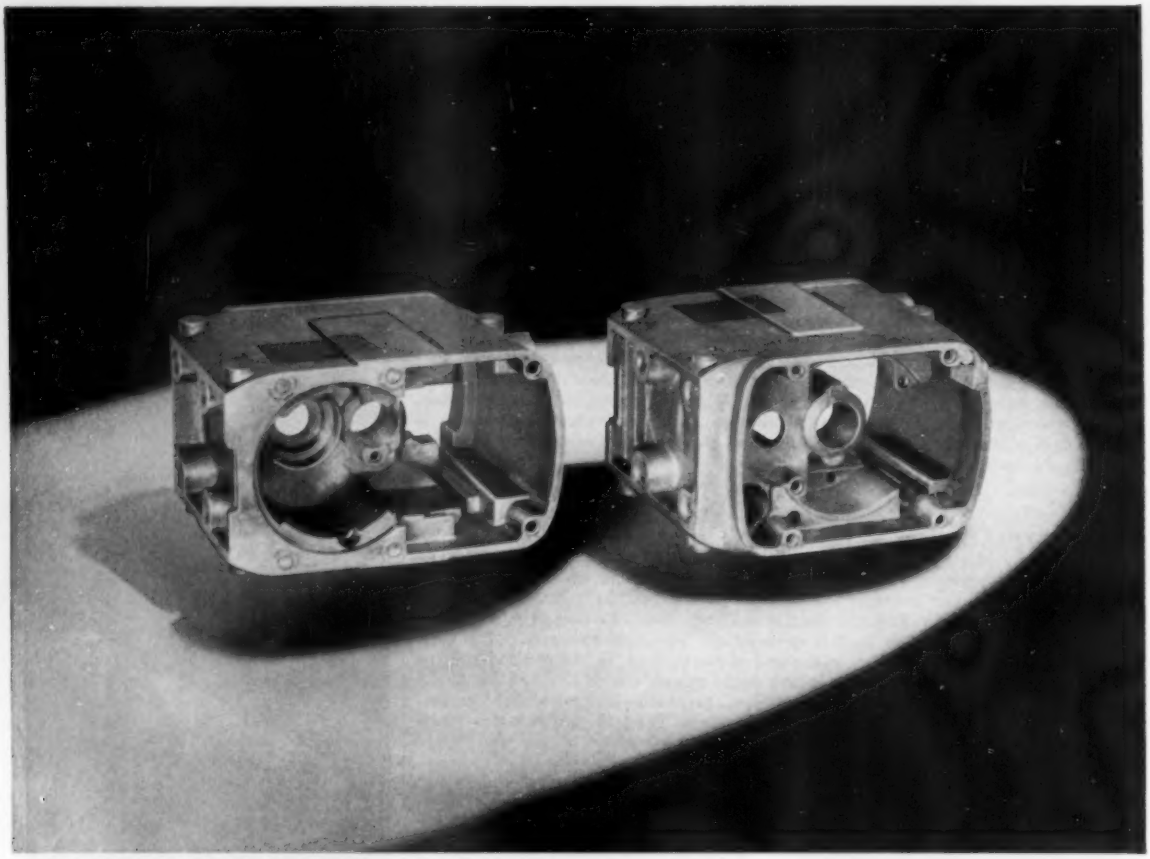


PARKER'S MOST IMPORTANT PRODUCT:

Proving That Die Casting Cuts Component Parts Costs

PARKER
SALES ENGINEERS

CHICAGO 49, Ill.
Ollie J. Berger Company • 2059 East 72 Street

CINCINNATI, Ohio
William H. Braxterman • 2174 Buck Street

DETROIT 35, Mich.
Hodgson-Geisler Co. • 18917 James Couzens

GIRARD, Penna.
Daniel F. Marsh • 35 Chestnut Street

KIRKWOOD 22, Mo.
Edward F. Higgins, Jr. • 102 West Adams Street

WILTON, Conn.
Girard L. Palmer • Belden Hill Road

SYRACUSE, N. Y.
J. C. Palmer • 712 State Tower Bldg.

BELLEFONTE, Penna.
Warren G. Olson • 420 East Linn Street

A sure way to cut component parts costs is to eliminate production operations. In the above part, note the involved coring and other design elements . . . especially the precisely positioned laminated steel insert. This intricate part with the insert cast into place was produced in **one die casting operation** by Parker. A good example of how Parker Die Casting produced component parts to exacting "specs" with a minimum of operation, and, therefore, at lowest possible cost.

The cost and design advantages of Parker Die Castings may save you money on your component parts. It will be worth your while to check. Just call the nearest Parker Sales Engineer listed here or write the factory direct.

Parker White Metal Company • 2153 McKinley Ave., Erie, Pa.

PARKER

ALUMINUM and ZINC die castings
POWDERED METAL PARTS

For more information circle No. 67 on the Reader Service Card

Here is maximum safety from hydraulic fires!

Pydraul F-9 hydraulic fluid was poured onto molten metal.

But even at 1200° F. Pydraul didn't burn.

That's because the Pydrauls are fire-resistant *chemicals*. They have all the lubricity of premium petroleum oil without the fire hazard, plus being noncorrosive, chemically stable, nontoxic, and reclaimable.

Whatever the temperature conditions and viscosity requirements of your hydraulic equipment, one of the specially tailored Pydrauls will keep it operating smoothly and efficiently with all the SAFETY possible.

Can you honestly afford *not* to use it?

Use Pydraul F-9, Pydraul 150, or Pydraul 600 in your hydraulic equipment. For FREE copy of informative "Pydraul F-9" booklet, or data on Pydraul 150 and Pydraul 600, write: Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Box 478-Y-6, St. Louis 1, Mo.

LISTED UNDER REEXAMINATION SERVICE UL OF UNDERWRITERS' LABORATORIES, INC.

PYDRAUL F-9—FIRST AND ONLY HYDRAULIC FLUID LISTED BY UNDERWRITERS' LAB

On May 31, 1955, Pydraul F-9 became the first fire-resistant hydraulic fluid listed by Underwriters' Laboratories. From the Laboratories' Service Card: "The fire hazard of (Pydraul) is rated 2 to 3 in accordance with Underwriters' Laboratories, Inc.'s Standard of Classification in which Ether rates 100, Gasoline rates 90-100, Alcohol(ethyl) rates 60-70, Kerosene (100°F. flash) rates 30-40 and Paraffin oil rates 10-20." See Underwriters' Laboratories, Inc.'s guide no. 540 I8, File MH6049.

Pydraul: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

WHERE CREATIVE CHEMISTRY WORKS WONDERS FOR YOU

For more information circle No. 58 on the Reader Service Card

CLEAN-CUT CASTINGS

Close-up view illustrates easy access to metal well from furnace — tie rods are staggered for better accessibility.

The "all new" H-P-M casts cleaner, faster and more accurately — the simple formula for reduced casting costs.

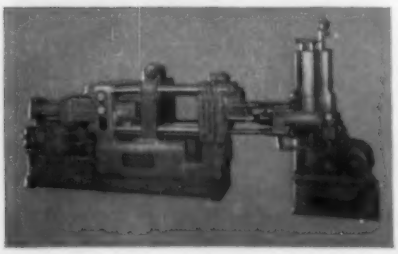
and "Right On The Button" For Size

Cleaner castings, negligible scrap and better dimensional control with production output to meet job requirements are the records being set at Ajax Die Casting & Manufacturing Co., Tulsa, Oklahoma. They're using the new H-P-M Die Casting Machine — the answer to many of today's die casting problems.

H-P-M's all-new clamp design cuts costs on casting jobs. Accurate closing of mold eliminates excessive flash—saves metal and expensive cleaning work, avoids customer complaints. The new clamp design has plenty of "beef" — limits elongation of frame, compression and deflection of locking members; clamps mold firmly during metal injection.

Mr. M. M. Alexander, co-owner says, "We find the new H-P-M Die Casting Machine to be thoroughly dependable and parts are being consistently produced within tolerances. Casting gates are clean-cut with a minimum of flash."

Write today for Bulletin 5400 and see how an H-P-M can *logically* reduce casting costs for you, too.



THE HYDRAULIC PRESS MANUFACTURING COMPANY

1094 Marion Rd.
MOUNT GILEAD, OHIO, U.S.A.

HPM

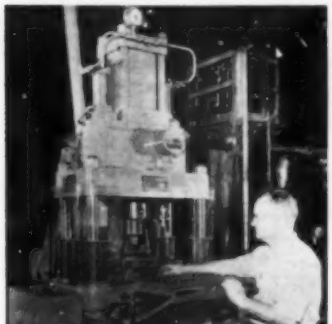
For more information circle No. 44 on the Reader Service Card

CASTING ABOUT
continued from page 21

INCREASED PRIMARY ALUMINUM production is planned by Reynolds Metals Co., which has announced a program to increase its capacity to 1.1 billion pounds. Bulk of the expenditures . . . about $200 million out of a total $230 million, will be devoted to the 270 million pound expansion of primary producing and related facilities, including new bauxite mines in Haiti and Jamaica and a giant coal-burning power plant in the Ohio River Valley.

MORE COMMERCIAL FINANCING than ever before is being used by metal-working firms to pay for jigs and dies, maintain parts inventories and replace obsolete machinery, according to Walter E. Heller & Co. of Chicago, exclusive commercial finance organization. The majority of this company's 14 percent gain in outstandings this year is to pay for rising design and pattern expense.

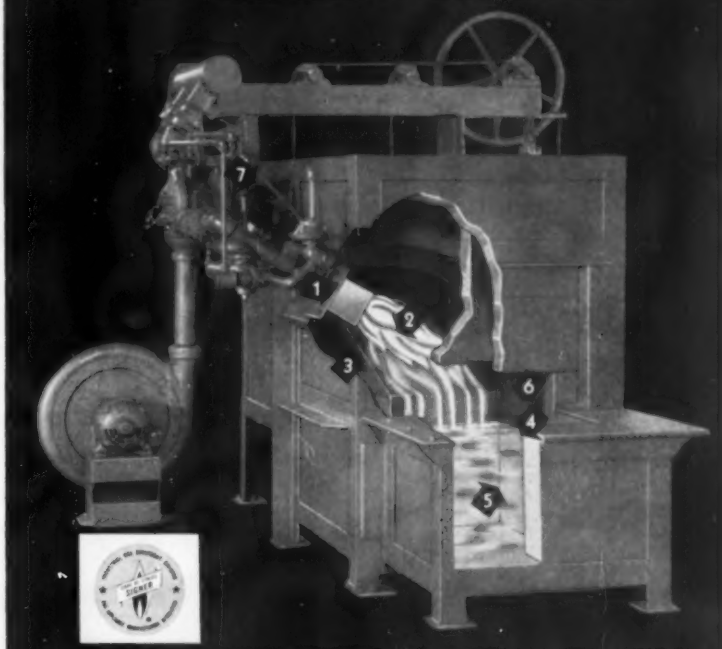
DOUBLED OUTPUT of powdered metal oil pump gears for the Ford Motor Company is reported as a result of the installation of a new metal powder compacting press installed in the Steering Gear & Machining plant, Dearborn. Production tolerances on eccentricity between ID and OD are now held to .0025 and .001 respectively, reducing the amount of grinding needed to bring the gears to size.



The new Baldwin-Lima-Hamilton press, a 50-ton machine installed five months ago, now turns out more than 900 gears an hour.

PLATING WASTE CONTROL has been set up, using electronic and pneumatic instruments to regulate the amount of lime and caustic solution to feed into the waste to neutralize it, at General Electric's housewares department in Allentown, Pa. Controls were developed by Minneapolis-Honeywell's Industrial Division for this new $110,000 plant which processes 100 gallons per minute.

NEW ADVANCED METHOD FOR MELTING ALUMINUM.



ECLIPSE DRY HEARTH, DOUBLE CHAMBER ALUMINUM MELTING FURNACE

For faster, low-cost production of higher quality castings

1. Direct heating permits high rate of production with minimum fuel consumption. Heat engulfs metal directly without flame impingement.
2. No cold metal is charged to the bath. Moisture is driven off *before* molten metal reaches holding chamber. No hydrogen gas is formed in the metal, giving you nonporous, stronger castings.
3. Steep sloping hearth permits molten metal to run off quickly. Prevents overheating.
4. Convenient dip-out height eliminates fatigue and speeds production. Only heat in work area is that radiated from top of molten metal.
5. Nonwetting refractory used wherever aluminum contacts furnace lining. Thus, metal cannot build up on, or adhere to bricking.
6. Five inches of insulation, plus 4½ inches of lining keeps heat *in*, saves fuel, and improves working conditions.
7. Pilots are located *above* and made integral with the main burners, thus can't become clogged with dross.
8. Can be adapted for firing any fuel.

Eclipse

For complete facts, write for new Bulletin No. C-80
ECLIPSE FUEL ENGINEERING CO., 1123 Buchanan St., Rockford, Ill.
Eclipse Fuel Engineering Co. of Canada, Ltd., Toronto, Ontario

For more information circle No. 32 on the Reader Service Card

SAMMY INGOT "DELIVERS THE GOODS!"

I'VE GOT A RUSH JOB THATS GOT TO BE DELIVERED BY TOMORROW NIGHT!!!
WE CAN GET THE JOB DONE JIM... BUT WHERE ARE WE GONNA GET THE ALUMINUM BY TOMORROW MORNING?
WORRY NO MORE... SAMUEL GREENFIELD CO. WILL DELIVER THE GOODS
BUT... CAN THEY HAVE A BIG SHIPMENT OF INGOTS HERE BY TOMORROW MORNING?
ABSOLUTELY... SAMUEL GREENFIELD COMPANY GUARANTEES OVERNIGHT DELIVERY ANYWHERE IN THIS REGION
THATS SWELL... I'LL CALL THEM RIGHT NOW!!!
IT'S GREAT TO KNOW THAT YOU CAN ALWAYS COUNT ON SAMUEL GREENFIELD CO. TO DELIVER THE GOODS ON TIME AND AT A COMPETITIVE PRICE!!!

"OUR INGOTS MAKE BETTER CASTINGS"

SAMUEL GREENFIELD ALUMINUM ALLOYS

- Chemically Pure
- Rigidly Supervised and Tested
- Certified Chemical Analysis Furnished

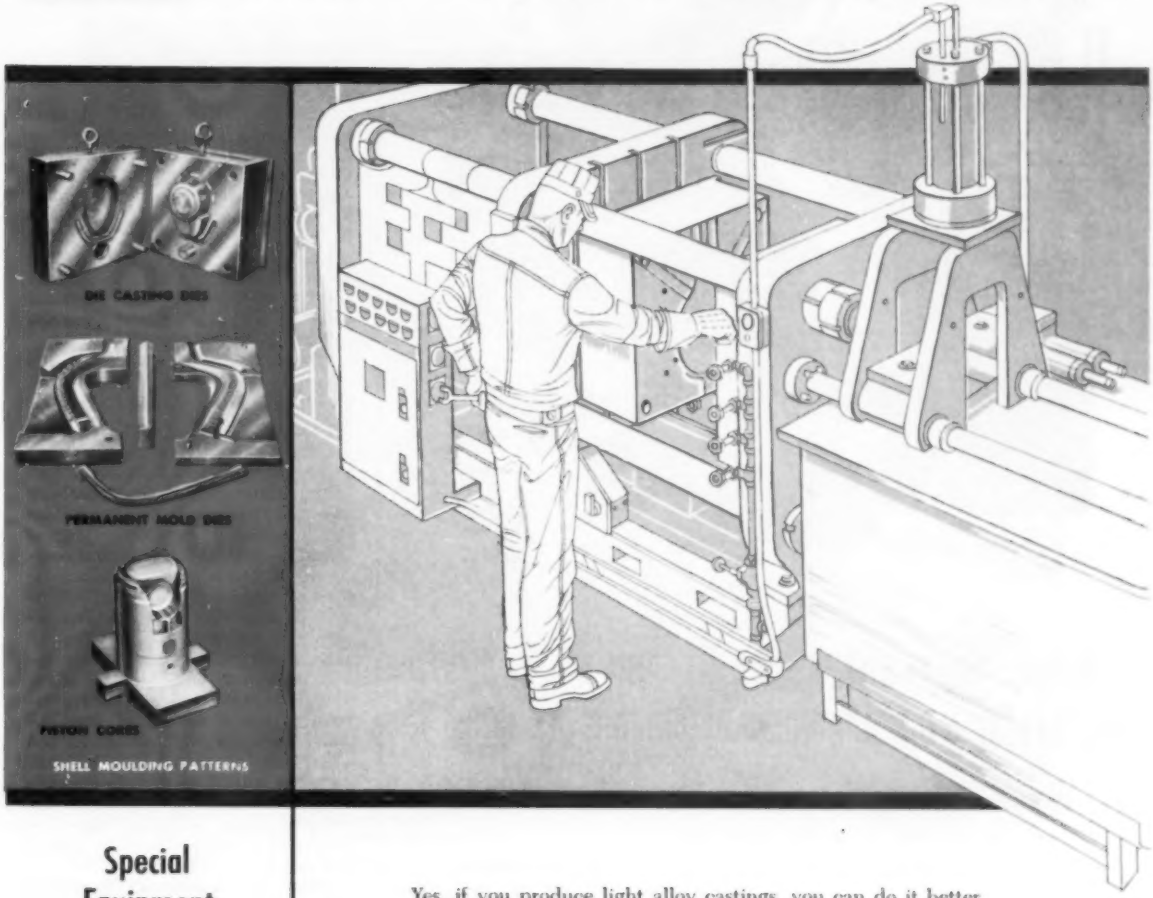
FREE FOUNDRY ENGINEERING CONSULTATION SERVICE

Over 120 years combined experience is yours at no obligation. Write or call . . .

SAMUEL GREENFIELD CO., INC.
31 Stone St. Buffalo 12, N. Y.
HUmboldt 4050

For more information circle No. 39 on the Reader Service Card

if you can do it with light alloys . . .
you can do it BETTER with PMD dies!



Special Equipment

Permanent Mold Operating Devices

D.C. Casting Units

Billet Molds

Coilers for Tubing

Trim Dies

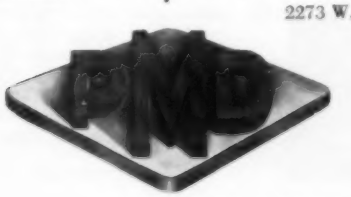
COMPLETE DESIGN AND ENGINEERING SERVICE AVAILABLE

Yes, if you produce light alloy castings, you can do it better with PMD dies! Longer service life, minimum starting problems, lower overall tooling costs—these are plus advantages you get from PMD!

One of America's largest independent producers of dies, molds, special machines and molding devices, Permanent Mold Die Company offers every facility to do the job right! Complete design-engineering service . . . skilled, experienced personnel . . . plus the specialized tools and equipment to meet every requirement.

PMD dies and molds are *guaranteed* to perform to your specification! For the right solution to your tooling problems—call in a PMD specialist. Write or phone today!

PERMANENT MOLD DIE COMPANY, INC.
2273 W. Nine Mile Rd., Hazel Park, Mich. Phone: SLocum 7-8100



WRITE TODAY FOR YOUR COPY OF THIS NEW PMD REFERENCE CATALOG!

For more information circle No. 68 on the Reader Service Card

"Hmm—maybe if we modify our tools a bit, we'll reduce our aluminum machining problems"

Good idea, I'll finish my sandwich. Then send for a copy of George Sall's 4-page booklet "Machining Aluminum".

This booklet is written in shop terminology offering economical solutions to everyday machining problems.

Copies of "Machining Aluminum" are available without obligation . . . write to our Metallurgical Department.

This is only one of the research and service facilities offered to industry by our company. In addition to controlling our quality with the most modern techniques known, our Metallurgical staff is always at your service. They will be glad to consult with you on any problems related to non-ferrous metals. We can also develop and produce special alloys for any special requirements you may have.

For superior service in non-ferrous metals, call . . . .

"Better Alloys for Better Castings Through Creative Metallurgy"

The George Sall Metals Co., Inc.

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PRODUCERS OF: Aluminum, Brass and Bronze and Zinc Alloy Ingot; Hardeners, Z-shot and bar for Zamak production; Salloy; Special Alloys

For more information circle No. 75 on the Reader Service Card

A review of recent U.S. PATENTS

A CENTRIFUGAL POWDER coupling in which the housing member is connected to one shaft and a loose-fitting disc member to the other shaft. Both the disc and the housing have elements that are capable of engaging with a supply of powdered metal contained within the casing. The powder engaging elements on both rotating parts are inclined in a radial direction with the inclinations in opposite directions.

(Patent No. 2,710,680 — Ubaldo Ranzi — issued June 14, 1955).

A CORROSION-RESISTANT, cemented carbide composition containing from 42% to 72% titanium carbide, substantially free of metallic titanium, free carbon, metal oxides and nitrides; from 4% to 15% of mixed carbides in solid solution composed of columbium, tantalum, titanium carbides; and from 20% to 50% of cementing material. The cementing material is an alloy of nickel and molybdenum with the molybdenum from 5% to 25% of the alloy composition. The entire composition has a density of from 5.6 to 6.8 grams per cubic centimeter and a hardness exceeding 83.5 Rockwell "A". The transverse rupture strength is greater than 150,000 psi and the material shows good resistance to oxidation at temperatures of 1800 F and above.

(Corrosion Resistant Sintered Stock Containing Mixed Carbides —John C. Redmond and John W. Graham—assigned to Kennametal, Inc.—issued June 21, 1955).

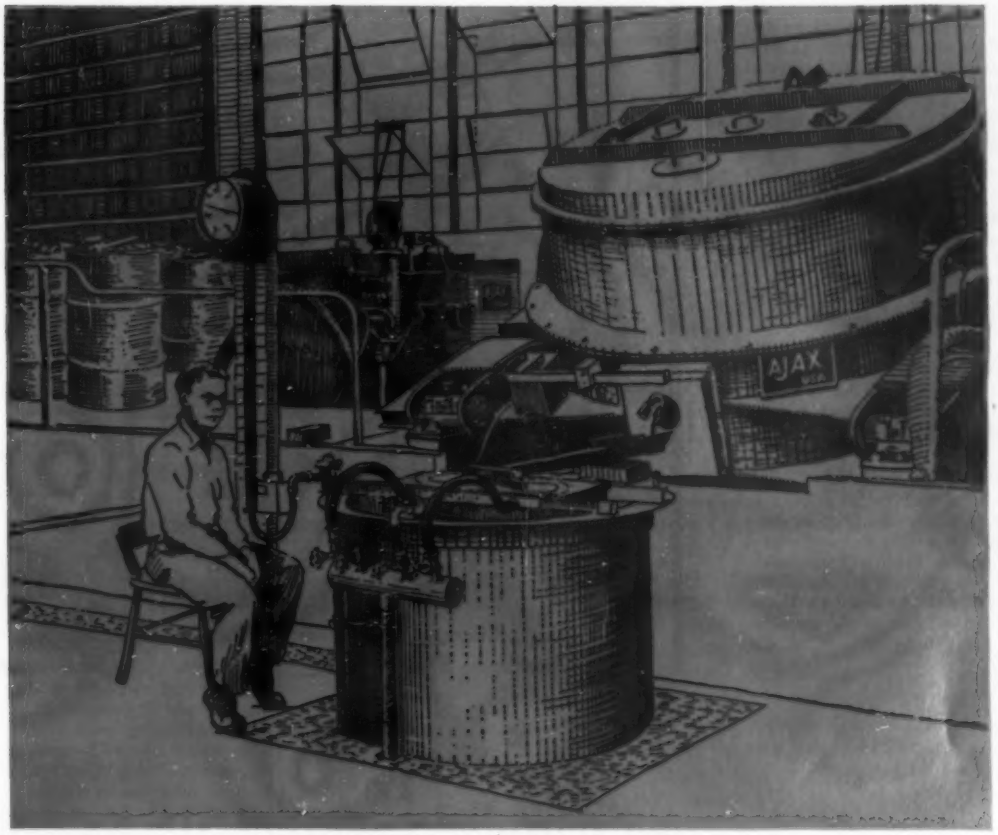
MOLD CLAMPING APPARATUS for use with either permanent mold castings or slush (turn) castings. The mold halves are clamped between two pressure plates, one of which is fixed and the other movable. The movable plate slides on rods and is shifted by a lever and toggle mechanism. In connection with the toggle mechanism is a so-called buffer plate that is spring loaded and can be made to move in a tilted position along the guide rods. The mechanism is equipped with ejector pins that are actuated by the buffer plate.

(Patent No. 2,711,567 — Mold Clamping Apparatus — Otto P. Knapp — issued June 28, 1955.)

Continued on page 31

AJAX INDUCTION FURNACES

Will Reduce Metal Costs for You Too!



INSTALLATION AT VALLEY METAL PRODUCTS COMPANY - PLAINWELL, MICH.
(SUBSIDIARY OF MUELLER BRASS CO.)

Manufacturers of "Vampco" architectural life long aluminum alloy extrusions, Valley Metal Products Co., use Ajax furnaces exclusively in their billet casting shop, because these furnaces enable them to produce aluminum alloy billets from selected scrap in the high quality required for their product.

The compact layout of this casting shop, shown in the picture, includes two 166 kw Ajax melting furnaces and one Ajax 10,000 lbs. holding furnace which pours into a semi-continuous casting machine. Operation is continuous. **Production is 750,000 lbs. per month.** Metal losses are below 1%. The holding furnace requires no fluxing or chlorinating. Maintenance is low. Working conditions are comfortable and permit full utilization of all productive efforts.

VISIT OUR BOOTH 1619 AT METAL SHOW, CHICAGO, OCT. 17 - 21

AJAX
TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., the Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

For more information circle No. 3 on the Reader Service Card

die casters' questions

Q. *Why are die lubricants important?*

A. Good die lubricants reduce downtime. They increase your production rate, make dies last longer, reduce rejects. In addition, they act as cooling agents on die cavity surfaces, permit better metal flow and easier fill-out, protect dies from erosion, and prevent welding.

Q. *Is there one all-purpose lubricant?*

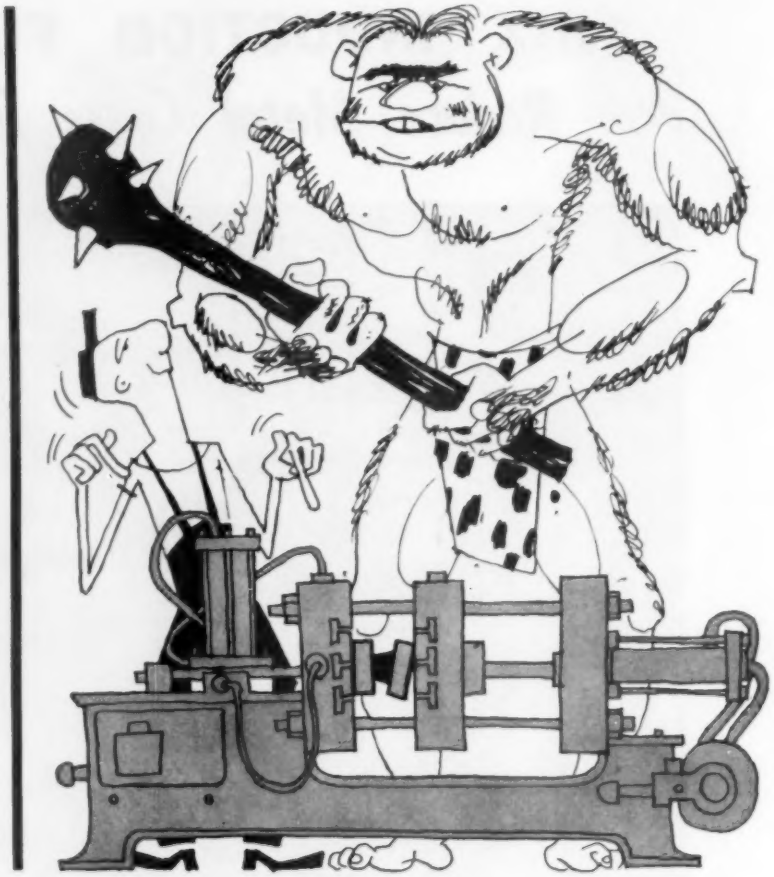
A. No. Casting temperatures and other properties of casting metals require different lubricants. A lubricant might be excellent for aluminum, but could cause stains and surface swirls on zinc.

Q. *Can you use too much lubricant?*

A. Yes. A cardinal principle of die lubrication is to use the least amount necessary for smooth ejection. Die Slick lubricants can be reduced to any consistency desired.

Q. *What's wrong with the formula we mix in our own shop?*

A. It probably works fine on some jobs. But on a different job, you'd have to guess. Why rely on guesswork when you can get standardized lubricants, proved on thousands of jobs? Die Slick has been proved for you by 80% of all die casters.



cut downtime; prevent stuck castings

When you use Die Slick, you insure your diecasting operations against the many high costs of downtime. Die Slick prevents sticking, soldering, ejector pin wear, and die damage. On difficult jobs, it often makes the difference between failure and success. We are confident that a week's trial in your shop will show you how Die Slick lubricants pay off in more production, better quality. To be sure we send you the most effective grade of Die Slick, please specify the metal or alloy you are casting.

Die Slick is a registered trade mark of G. W. Smith & Sons, Inc.

DIE SLICK

used by die casters everywhere

G. W. SMITH & SONS, INC., 5400 KEMP ROAD, DAYTON 3, OHIO

For more information circle No. 77 on the Reader Service Card

RECENT PATENTS

continued from page 28

DESIGN OF A PERMANENT MOLD suitable for casting hollow objects. The two mold halves define the mold cavity while a core-rod is provided to form a vertical cavity. Two or more side cores are provided, linked to the vertical core in such a manner that when the center core is withdrawn by pulling it down, the side cores are retracted and fall into the cavity left by the withdrawal of the center core rod. Locking means are provided to hold the side core firmly.

(Patent No. 2,711,568 — Frederick B. Palmer, Dale A. Brown, Lester L. Pond and William R. Hinz — assigned to Bohn Aluminum & Brass Corp.—issued June 28, 1955).

A METHOD OF MAKING disposable patterns by preparing a powder of frozen mercury, placing the powder in a compacting die and subjecting it to pressure to make the powder conform to the shape of the compacting die. The die is maintained at below the melting point of the mercury.

(Patent No. 2,711,570 — Seymour J. Sindeband—assigned to Mercast Corp., issued June 28, 1955).

A MOLTEN METAL pump having a metal holding chamber that is approximately triangular in vertical cross section. The two lateral walls are inclined downward toward each other with an inductor unit attached to the outside of one of these walls. A secondary melting loop and a primary transformer assembly in the inductor unit and threading the secondary melting loop.

A refractory tubular pouring spout is inclined relative to a horizontal plane located in the metal holding chamber and extending with its inner end into the melting loop and the outer end outside the chamber.

(Patent No. 2,707,718—Induction Pump For Casting Molten Metals —Mario Tama, assigned to Ajax Engineering Corp.—May 3. 1955).

A METHOD of continuous casting light metal ingots in which the molten metal is continuously supplied to a short open mold shell. The metal is allowed to cool somewhat so that a shell of solid metal is formed. As the ingot emerges from the mold shell it is rapidly cooled by a liquid coolant. After the ingot has traversed a short distance the coolant is removed so that the internal heat maintains the surface temperature about 300F.

(Patent No. 2,705,353—Method of Continuous Casting—Paul P. Zeigler, assigned to Kaiser Aluminum & Chemical Corp.—Issued April 5, 1955).

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...switch to

UCON Hydrolubes
Trade-Mark

For maximum fire-resistance, maximum protection for men and machines, change to UCON Hydrolubes—CARBIDE's safety hydraulic fluids. Severe, exhaustive laboratory tests and 7 years' industrial use have proved their resistance to burning.

UCON Hydrolubes are balanced formulations. They contain modern synthetic lubricants and anti-wear agents for lubricity, water for non-flammability, effective liquid and vapor phase corrosion inhibitors for the protection of your equipment, an anti-freeze to keep the pour-point low (below minus 55°F).

You don't have to revamp your equipment to change to UCON Hydrolubes. They have no harmful effects on packings and seals . . . are supplied in a range of viscosity grades . . . have high viscosity indexes (150 to 160) . . . present no toxicity problems.

Remember: **SAFETY** *is no accident . . . return the coupon today.*

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Company _____ Position _____

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RECORDED TESTIMONIALS

JOSEPH L. RAYNIAK, JR.
Vice-President
Outboard Marine & Mfg. Co.

"We got the original of this model two years ago. We're clamping dies that formerly had to be run on much larger equipment."

W. J. GRASSBY
Superintendent, Die Casting & Mfg. Divison
Bendix Aviation Corp.

"Our Production Castings must withstand high pressures without leaks. Our Lesters maintain this high quality and keep our die maintenance costs low."

Others say...

"The impact pressure that the Prefill on the 3X delivers, has given us a new high in quality and a new low in rejects."

—**L. J. Sebek,**
Central Die Casting & Mfg. Co.

"We have five of these new Lesters in our plant and they are doing excellent work on our complicated engine castings."

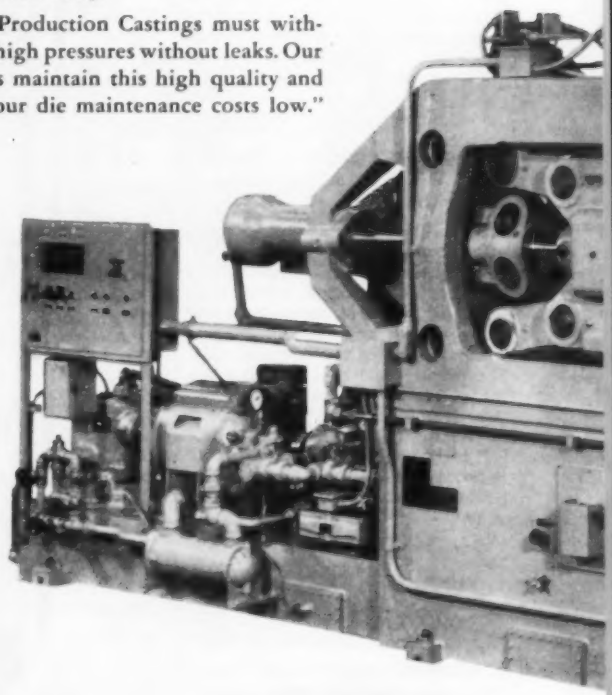
—**A Midwest Proprietary Manufacturer**

"We never saw die castings before like the ones we're getting off our 600 ton Lester. Density is absolutely essential in our parts —and this machine delivers it."

—**An Automotive Part Manufacturer**

"The machine is new in our plant, but it behaves beautifully and so far has lived up to all we expected of it."

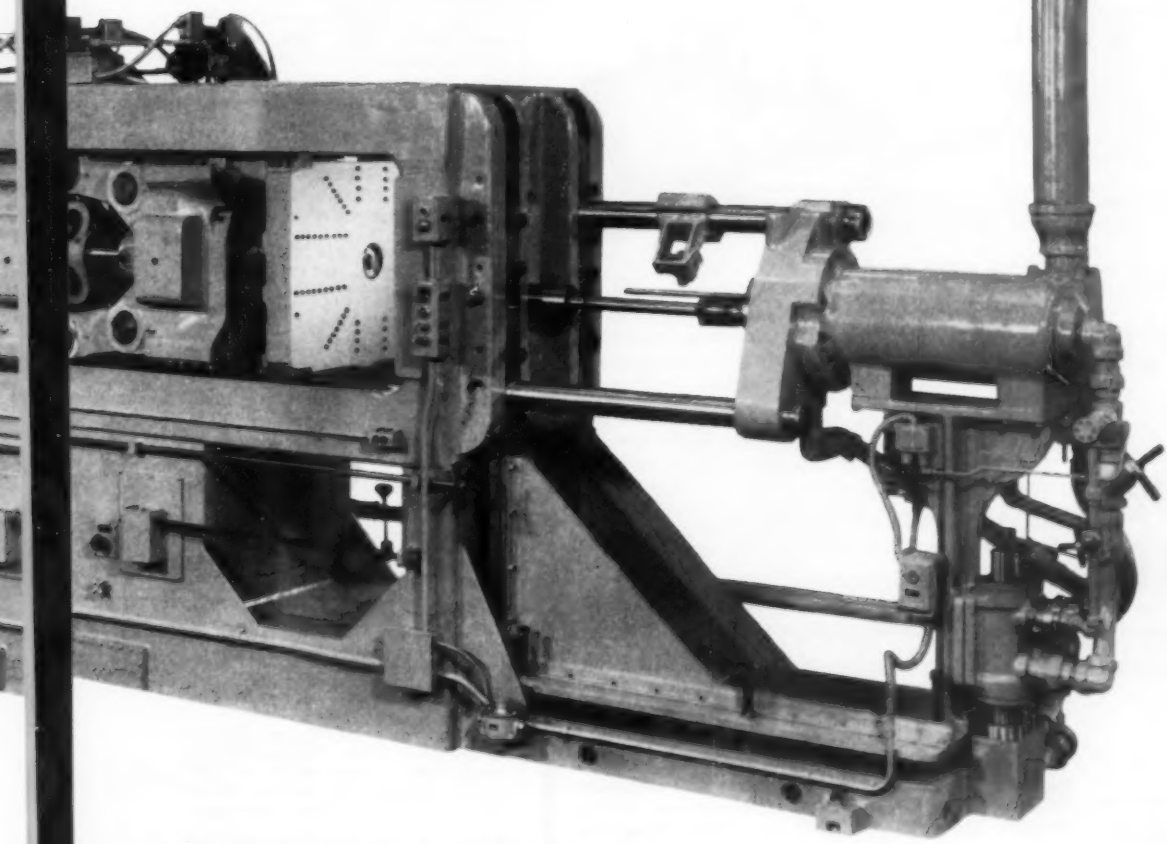
—**A Chicago Contract Die Caster**



LESTER

acclaim NEW 600 ton LESTER

In spite of the fact that this is the first public advertisement on the new 600 ton HP-3X-SF Lester, we are shipping as many as we are capable of building—as a result of testimonials like those on the opposite page. Everyone who has had this machine in his plant over three months has reordered it. This kind of acceptance is the ultimate testimonial on the ability of these machines to *PRODUCE.* Are you as satisfied with *your* equipment as these men are with their *LESTERS?* Write for detailed information.



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Stockholm, Sweden . . Aktiebolaget Servus
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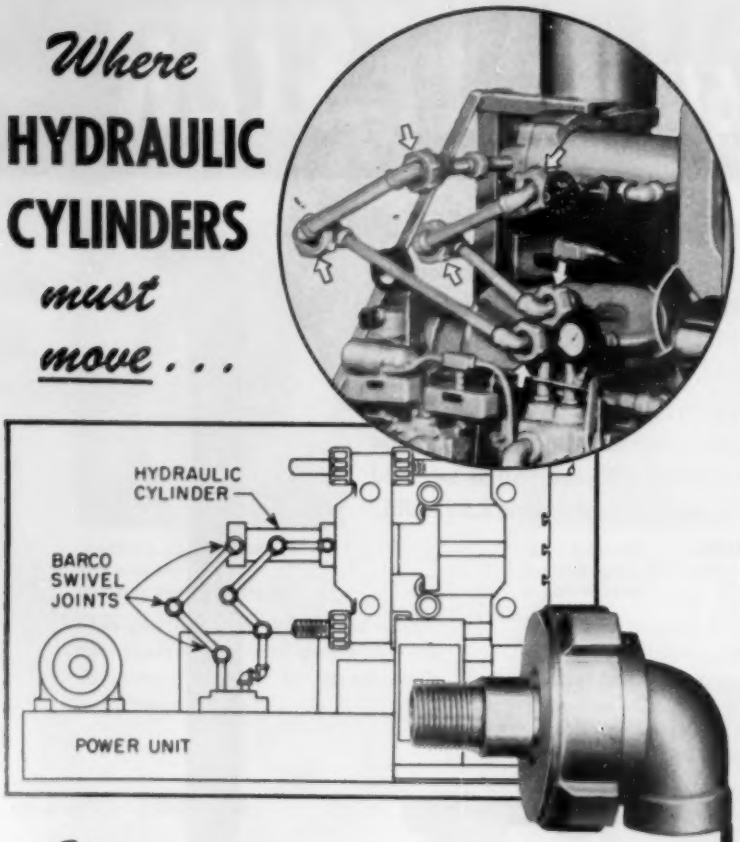
Where
HYDRAULIC CYLINDERS
must
move . . .



Use
BARCO
Self-Aligning
SWIVEL JOINTS

THE Barco "Self-Aligning" Swivel Joint is one of the most useful, most versatile fittings ever developed for making flexible piping connections to moving or movable parts on injection molding presses, die casting machines, and other hydraulically operated equipment.

ENGINEERED INSTALLATIONS—Easy to position piping accurately. Put flexibility where you want it—without the nuisance of sagging, flopping, non-rigid lines. No restricted internal diameters.

BETTER CONTROL—No swelling or expansion in lines under pressure. Positive control action—no "mushiness."

PRESSURE SAFE—Barco Joints will not break or blow out suddenly. High temperature and fire resistance. Installations stay leakproof. No lubrication required.

EASY TO INSTALL—Barco's *self-aligning* feature simplifies and speeds up installation, saves time in pipe fitting, prevents binding, and minimizes wear.

Barco builds a complete line of swivel joints for every purpose. Ratings as high as 600°F., 3,000 psi (hydraulic). Sizes ⅜" to 2"; angle or straight. For complete information and recommendations, see our nearest representative or write BARCO MANUFACTURING CO., 566K Hough St., Barrington, Illinois.

ASK FOR BULLETIN 265A

BARCO

THE ONLY TRULY COMPLETE LINE OF FLEXIBLE BALL, SWIVEL, SWING, AND REVOLVING JOINTS

For more information circle No. 16 on the Reader Service Card

Orville T. Barnett has been promoted to assistant manager of the metals research department at *Armour Research Foundation of Illinois Institute of Technology.*

Robert L. Williamson has been appointed manager of pig and ingot sales and **John S. Hamilton** as manager of foil product sales for the *Aluminum Co. of America.*

Harold D. Prior has been appointed manager of the Washington, D.C. office for *National Lead Co.*

The Tompkins Co. has been appointed sales representatives for *Wakefield Bearing Corp.* Their territory will include Louisiana, Texas, Colorado, Kansas, Oklahoma, Arkansas, Missouri and part of Idaho.

John W. Shier has been appointed assistant general manager of *Acheson Colloids Co.* **Bart C. Dickey** has been promoted to production manager of the company.

Arthur J. Zwarzig has been appointed assistant to the vice president and general manager of *Alloy Precision Castings Co.*

Edward L. Dreyer has been elected president of *Adamas Carbide Corp.*

John D. Harper has been appointed assistant general manager of the smelting division of *Aluminum Co. of America.* **R. R. Sugg** has been named manager of the Rockdale, Texas smelting plant.

Wallace E. Gordon has been appointed director of the advertising dept. for *E. I. du Pont de Nemours & Co., Inc.*

Will Johr has been appointed as sales engineer of cemented carbide and Tantung cutting tools in the central Illinois territory for *Vascoloy-Ramet Corp.*

The *Udylite Corp.* has announced several new appointments in the Udylite Division. **L. Eugene Drury** has been made facilities manager.

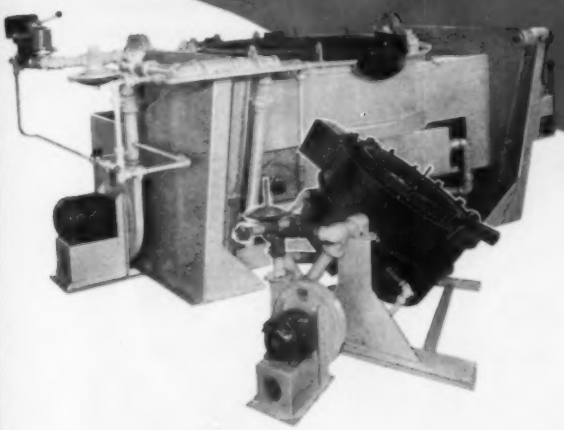
William J. Blashill is manager of manufacturing and **Louis J. Minbiole, Jr.** sales manager.

Fred Zajac has been appointed Detroit service engineer for *Acheson Colloids Co.* **Frank M. Hunter,** formerly service engineer in this terri-

Continued on page 108

For more information circle No. 80 on the Reader Service Card

Get Perfect Pours Faster at Lower Costs WITH STROMAN FURNACES



Yes sir, you can bank on Stroman Foundry Equipment to deliver metal the way you want it, when you want it, everytime . . . for Stroman are the leaders in design of metal melting furnaces and equipment. For many years they have set the pace in the field, producing the finest furnaces that have effected tremendous economies for foundries, die caster, sand caster and permanent mold plants. They can do the same for you. Get full information . . . write for NEW Bulletin 900 today!

STROMAN TYPE "NL" FURNACES

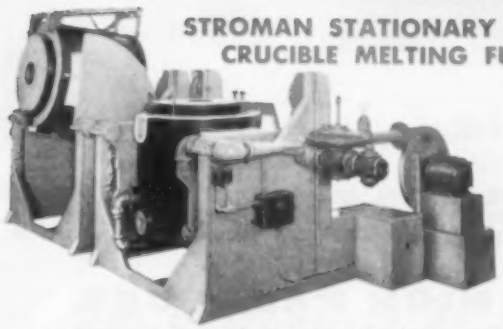
For Aluminum, Zinc, Lead, Kirksite and other Soft Metals.

These furnaces have many uses and are particularly efficient when large pieces of metal or bulky scrap is to be remelted. The iron pots have a large diameter and a comparatively shallow bath. Available in choice of Hand Tilt or Hydraulic Tilt with Stationary Lip Pour.

STROMAN LARGE SIZE REVERBERATORY FURNACES

For melting unlimited capacities of Aluminum, Zinc or Brass.

Excellent for Smelting, Extrusion Work, Die Casting, Permanent Mold and Foundry Melting. Built to meet your particular melting problem. Now in use in many of the largest manufacturers of castings.



STROMAN STATIONARY LIP POUR CRUCIBLE MELTING FURNACE

For Brass, Bronze, Aluminum and other non-ferrous metals. Capacities from No. 60 to No. 1000 Crucible.

These furnaces with Stationary Lip Pour that assures a constant pouring arc meet specific needs in handling various metals for the foundry, permanent mold, die casting plants and rolling mill. It is ideal for use with monorail or dolly ladle for large quantities of metal. Eliminates spillage and waste.

STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals. Sturdy, efficient and featuring the Stroman Push-Back Cover these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 crucible.

STROMAN FOUNDRY EQUIPMENT

• Oil Burners

For ordinary or extremely high temperatures. A type built for every purpose.

• Centrifugal Blowers

Precision fabricated to deliver combustion air in any desired pressure or volume.

• Oil Pumping Units

Come complete, ready to hook into your heating system. Fool proof in operation.

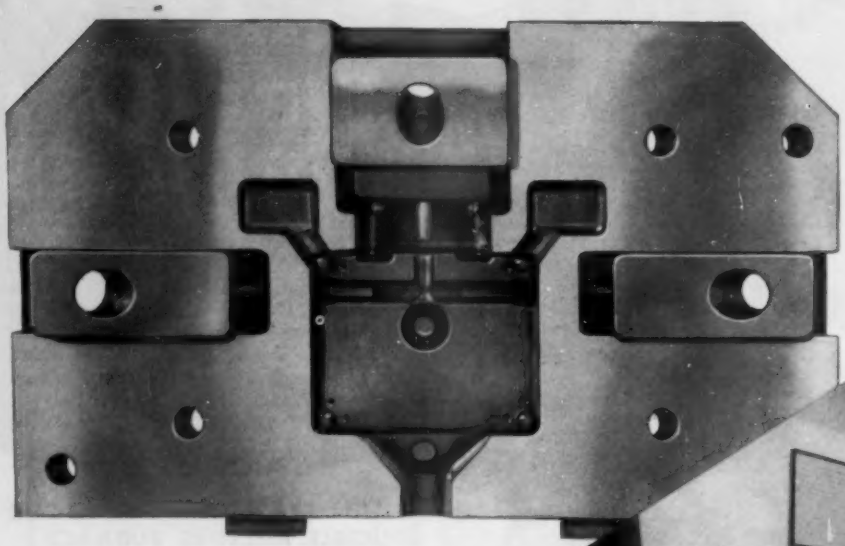
Write for NEW CATALOG 900

just off the press!

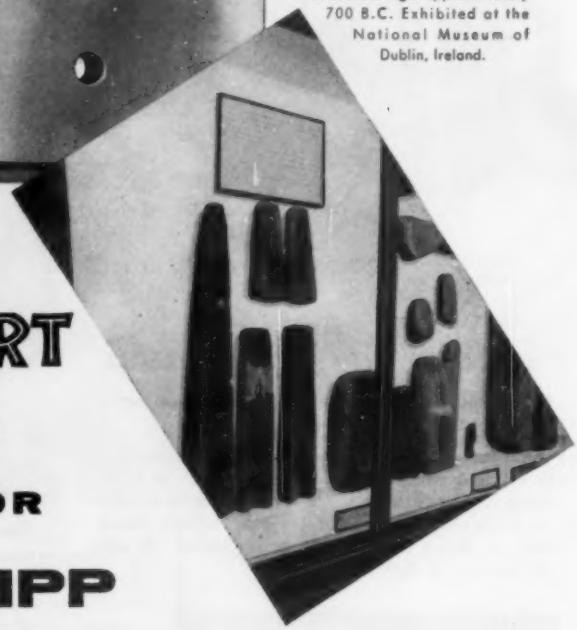
All New Equipment. Do it now!

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF THE PETERSEN OVEN CO. • FRANKLIN PARK, ILL.



A portion of a modern die casting which has coring on five sides of the casting.



Below: Stone moulds of antiquity for bronze spears and tools from the Bronze Age approximately 700 B.C. Exhibited at the National Museum of Dublin, Ireland.

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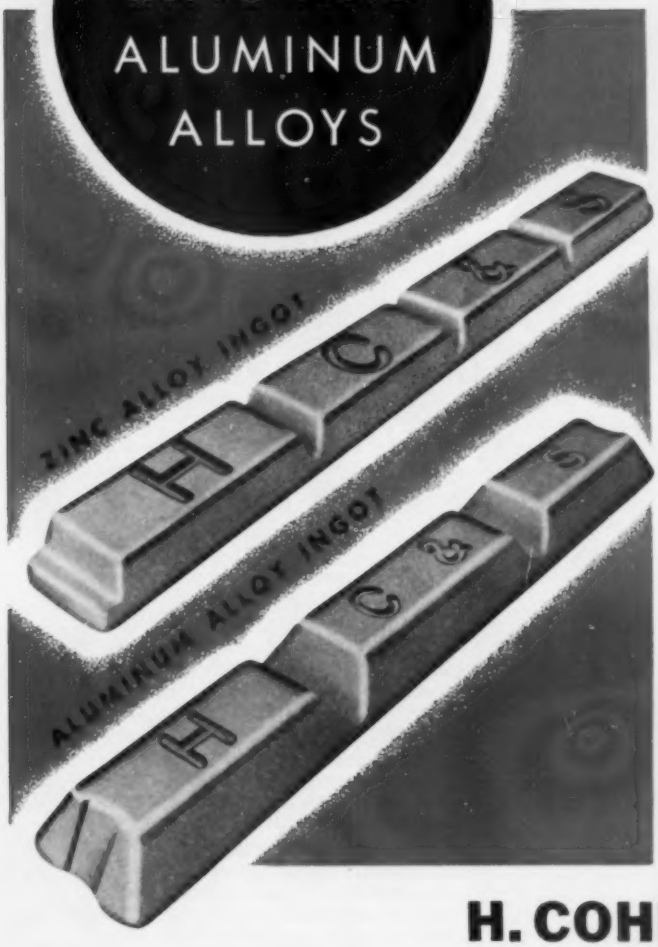

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..sand castings
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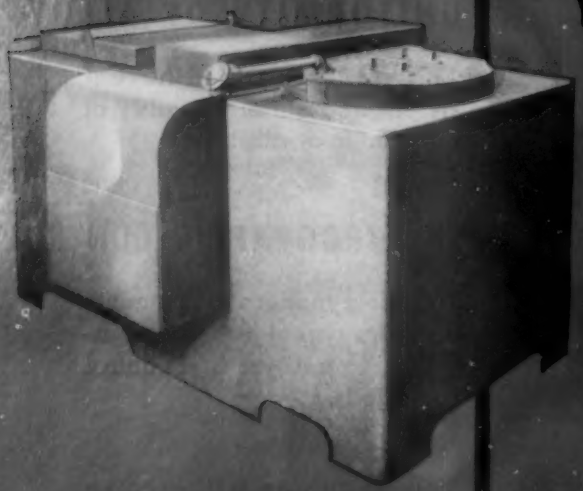
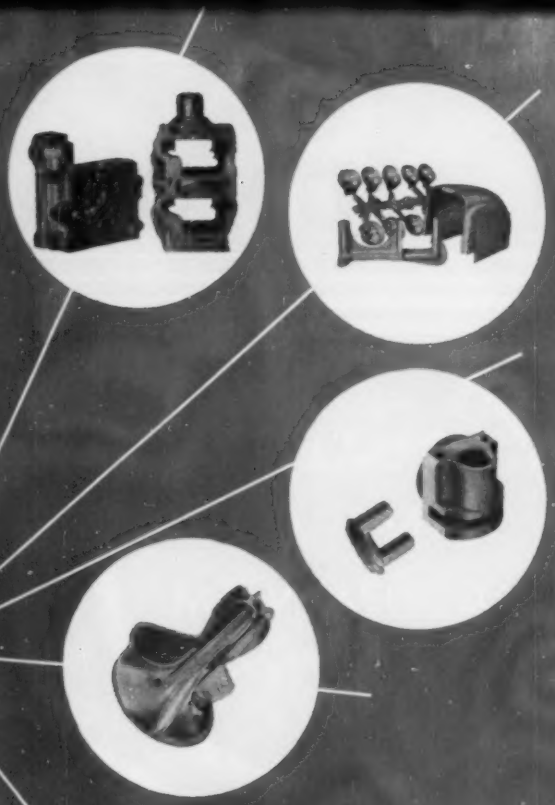


For additional information ask for bulletin 560.



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2-CHAMBER MELTING FURNACE

You'll increase production. You'll reduce rejects. You'll improve working conditions. The famous Lindberg-Fisher 2-chamber construction does the trick.

Two-chamber construction gives you cleaner molten metal. Residue and impurities remain in the charging chamber . . . and only the clean, residue-free metal passes to the ladling chamber.

Two-chamber construction permits continuous ladling. Cold metal can be added to the charging chamber without affecting temperature of ladling chamber within operating limits of the furnace.

Two-chamber construction permits cooler operation. Induction heating heats only the metal, not the entire furnace. There are no flames—no products of combustion. Only a comparatively small area of molten metal is exposed to operator.

LINDBERG-Fisher MELTING FURNACES

A Division of Lindberg Engineering Company · 2443 West Hubbard Street · Chicago 12, Illinois

Five years ago, on the occasion of our twentieth anniversary in business, we ran the accompanying editorial. It is just as true today as it was then. Change the figure "20" to "25" and you have our story today EXCEPT that we have enjoyed five more years of building, five more years of health, five more years of God's blessings for all of which we are truly thankful. We will do our utmost in the next five years to maintain your respect and confidence.

25 years

THE FACT that our company is 25 years old this month is relatively unimportant to anyone except ourselves. Thousands upon thousands of other companies have become 25 years old, and much older. But to us, the important thing is the way in which this company started, and the way it has progressed these 25 years. Because only in America could this story have been written.

This company started on the ashes of a depression failure. Our first magazine, INDUSTRY AND WELDING, had 24 pages in each issue, of which 3, 4, 5, or 6 were advertising. At 3, 4, or 5 pages, we couldn't pay our printer, but with 6 we could just make it. Whether there were 3, 4, 5, or 6 pages of advertising at no time removed the personal necessity of eating, dressing, and traveling to get the 7th, 8th, and 9th page of advertising. Somehow, we muddled through. In America, you can do those things—with pride.

Many were the times when it looked as though we couldn't make it, and always, when it looked blackest, some miracle would happen and we'd be in business—for another month at least. We stuck. Friends were good to us. People had faith in what we were doing. You find that Americans like to help other Americans who are trying to help themselves. It is the essence of our country, of free enterprise.

No government questioned our right to be in business. No bureau told us what to print or how it should be said. We were free to make whatever profit we could manage and reinvest it in our own business or in any other way we saw fit. That, too, is the American way.

We chose to start magazines in other fields. No one told us what fields to start in or whether we could go into them. As long as we were willing to work and take the beating that every new, small business must take, we were permitted to build our own business in our own way.

These 25 years have been gratifying ones. It has been fun building a business. There's been a lot of hard work, long hours, and various worries, but we're glad we're in the publishing business, because we feel that we have contributed something to industry and to the general welfare of our country. We shall continue to do so. But again we say, ONLY IN AMERICA COULD THIS STORY HAVE BEEN WRITTEN. It is one of our great heritages which, unfortunately, we take for granted, and it's one worth keeping and worth fighting for.

Irving B. Hexter

Irving B. Hexter, Publisher

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THE NEW ENGLAND DIE CASTING CO.

445 Front Ave. West Haven, Conn. • P. O. Box 1281 New Haven, Conn.

1935 1937 1940 1941 1942 1944 1946 1948 1950 1952 1954 1955

....and what about next year?

PMM DIE CASTING FORECAST ISSUE

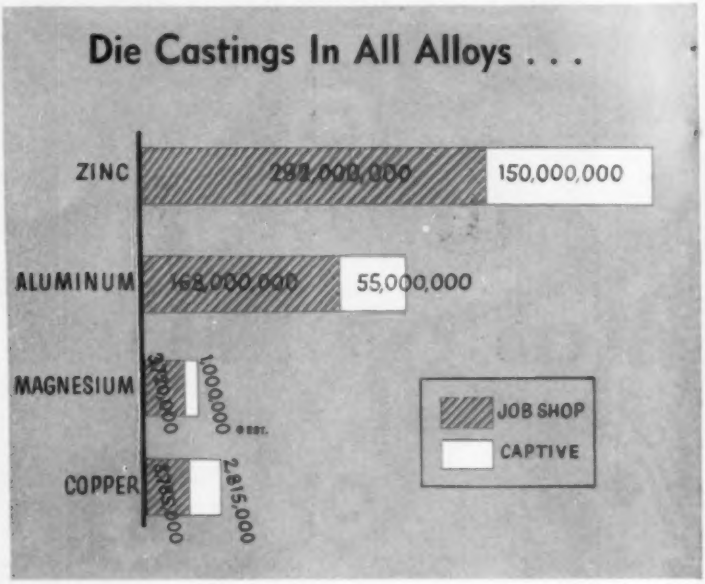
NEARING the end of what promises to be far and away the biggest year in its history, the die casting industry has reason to look ahead to 1956 with confidence. From many quarters there are indications of a very healthy year ahead, but there are also some vital questions still to be answered.

While orders now on hand indicate that more die castings will be used per car, will the volume of car sales continue at present rates? Are other industries going to use more or fewer die castings in new product designs? If the demand for die castings continues to rise, will the metals industry be able to supply enough aluminum and zinc? Will new technological developments in die casting affect the picture during the coming months?

To get the total picture of the prospects for 1956, the editors of PMM have asked questions of many people concerned with die castings: designers, purchasing men, producers of die castings, suppliers of metals, builders of equipment, trade association executives, metallurgists, researchers and manufacturers of finishing materials. The conclusions based on all this information . . .

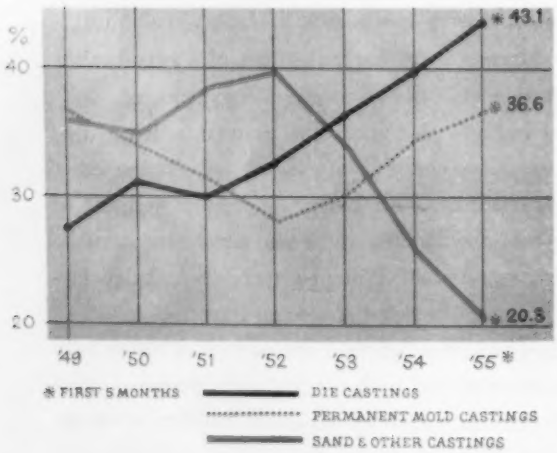
1956 will be even bigger. Here are some reasons for thinking so.

PMM DIE CASTING FORECAST ISSUE



METAL SUPPLY:

Aluminum . . . More Is Die Cast This Year



INDUSTRY'S insatiable appetite for die castings promises to make 1956 the busiest year that die casters have ever known. Auto and appliance production is expected to top this year's record output, bringing with it a demand for more and more die castings.

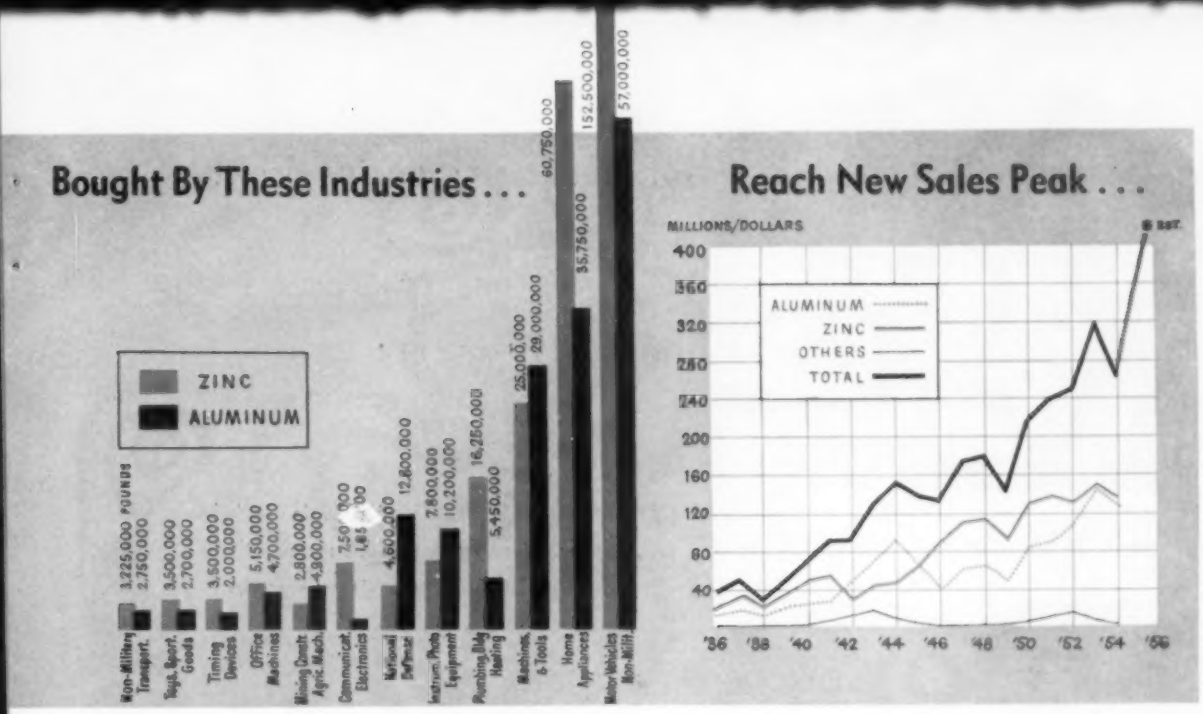
Biggest question mark concerning the expanding consumption of die castings next year does not concern either a lack of customers or a lack of die casting facilities, but rather, it concerns the ability of the metal supply industry to make available enough zinc and aluminum to meet the anticipated demand.

An extremely tight metal supply situation has existed for several months, with both zinc and aluminum die castings consuming alloy at a rate far above the previous peak year of 1953.

Estimates of the year's totals of die casting tonnages, described by David Laine, secretary of the American Die Casting Institute as far beyond the most optimistic predictions, show 1955 totals: zinc—340,000 tons; aluminum—350,000,000 pounds (with an additional 27 million pounds of aluminum alloyed in zinc die castings).

The question is not a simple one, for it involves a complex relationship of supply and demand, problems relating to export of scrap aluminum, government stockpiling, shortage of nickel for chromium plating, construction of facilities for producing more Special High Grade zinc from domestic sources, import duties on foreign zinc, and other less tangible factors.

The vice president of a major zinc producing company told PMM that his company expects the supply of zinc die casting alloys during the next twelve months to be somewhat greater than during the past



MORE IS NEEDED TO MEET ANTICIPATED DEMAND

year. The increase, he believes, will be in the order of ten percent.

On the other hand, a spokesman for the aluminum smelting industry pins the hope of stability on the control of scrap export.

What may force a prompt solution to the supply situation is the knowledge that this year's gains in usage of die castings can only be maintained in 1956 and 1957 if users of die castings are assured of having enough metal at competitive prices.

Government action, too, is needed. Phases of the current situation over which no company or group of companies has any control are those connected with export of scrap, import duties, and stockpiling.

A session this month will bring together representatives of the producers of primary and secondary aluminum, slab zinc and alloy for a discussion of facts and possible action. This will be the major item on the agenda at the annual meeting of the American Die Casting Institute which is taking the initiative. This organization has been very active in presenting its case before government agencies and the metal suppliers to stimulate remedial steps.

ZINC

The first five months of 1955, according to the Bureau of Mines, saw a rise of 29 percent in the consumption of zinc over last year. Stocks of slab zinc on hand compared with unfilled orders tell the story. According to American Zinc Institute figures, smelters had 124,277 tons in inventory at the end of 1954, with unfilled orders of 45,862. By the end of the first six months in 1955, the picture had changed drastically, with stocks on hand down to 48,612 tons compared to unfilled orders of 57,231 tons.

Prices have been firm and, during the year, edged upward, but suppliers have been successful in resisting strong upward pressures resulting from the heavy demand. Domestic smelters are attempting to hold as close as possible to the present favorable price levels of zinc, although rising labor costs, the limited offering of foreign metal and increasing demand favor higher prices.

Some additional zinc will also be forthcoming as new facilities get into production, such as the new electrolytic zinc plant at Corpus Christi, Tex. It will have an effective capacity of 9,000 short tons of special high grade zinc monthly . . . 2,500 tons more than at present.

ALUMINUM

Scrap metal accounts for 80 to 85 percent of the raw material used in aluminum die casting today. This so-called secondary, or smelters aluminum, gives properties equal to those of the primary metal, usually at a lower price. Die casters have historically depended upon this source of aluminum.

With demand at an all-time high, based on firm orders for the coming year, the die casting industry will need assurance of the availability of primary ingot to meet production schedules. Now that the automatic transmission (built mainly of aluminum die castings) is virtually standard equipment, no slackening of demand for aluminum is expected, even if auto sales should dip as much as 15% below 1955.

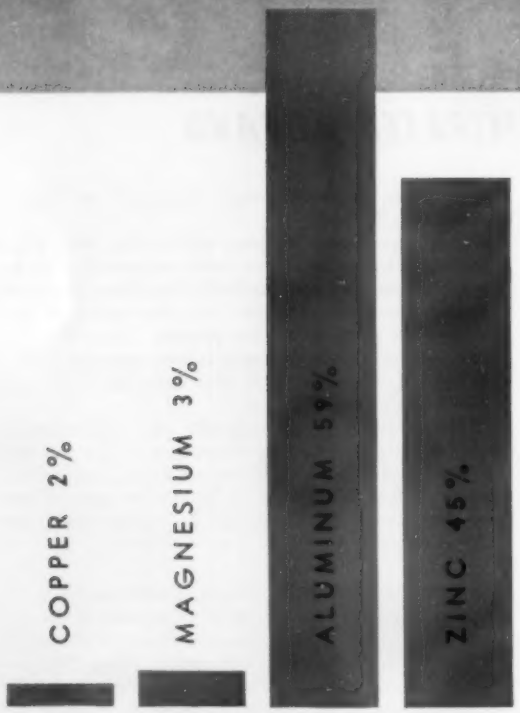
Continued on page 104

Die Castings will be used in 74 % of products now being designed . . .

WILL USE DIE CASTINGS/114

NO NEW DIE CASTINGS/40

A SURVEY OF DESIGNERS in 13 industry groups manufacturing metal products reveals that the majority will use die cast components in new models.



ALUMINUM DIE CASTINGS will be used in 59 percent of new products that include die castings; zinc will go into 45 percent. The total is greater than 100% because many companies plan to use die castings of more than one alloy.

DESIGN

Redesign of

MORE products will use more die castings next year.

This conclusion can be drawn from the comments of 154 engineers, buyers and company executives who participated in a survey conducted during July by the editors of PMM.

Not only will 114 companies of those included in the survey use die castings in new products now on the drawing board, but in the majority of cases, the new products will use a larger number of such castings than the old ones did.

The trend is not limited to any single industry, for the replies, received from companies whose products may be grouped in 14 different categories, were quite consistent in their comments. These companies were selected on a wide-spread geographical basis from among industries which are potential users of die cast components.

Most of the new die castings will be conversions from some other fabricating method, but about 25 percent indicated that these are original die casting designs. Redesigns of sand castings lead the field, with 32 percent showing conversions from this type of casting to the more precise die castings. Stampings

. . . and 89% of these will have more die castings than in previous models

MORE DIE CASTINGS/98

LESS DIE CASTINGS/12

MOST COMPANIES whose products now include die castings plan to increase their usage in future models that are now on the drawing board.

TRENDS

Sand Castings Lead the Trend

account for 14 percent, machined parts for 11 percent, and the balance evenly divided among forgings, weldments, plastic, and permanent mold castings.

Out of the 114 having die castings in their new products, 90 indicated aluminum and 70 zinc, many of these having castings in both metals.

Products manufactured by companies included in this survey include the following categories. Because several companies manufacture products in more than one category, the total is greater than the number of firms participating.

Business machines	24	Electrical devices	10
Household appliances	19	Photographical and optical equipment	10
Hardware, heating, and lighting specialties	18	Vending, selling, dispensing equipment	10
Automotive products	18	Gasoline engines, outboard motors, mowers, etc.	8
Special-purpose machines	14	Farm equipment	6
Instruments and controls	14	Portable tools	6
Communications equipment	10	Aircraft	4

Here's what they say about using die castings . . .

Typical responses in various fields: A company which has been using die castings "since die castings were first made" is the Rudolph Wurlitzer Company, yet their new products will contain more die castings than previously, in zinc, aluminum and magnesium, according to methods engineer J. C. Kamp.

•

"Since the war, we have had occasion to design intercommunications systems into plastic cabinets, but encountered problems of cold flow in the material. Based on this experience, we resolved to use die castings for such applications. We needed thin sections, good surface detail and attractive styling in metal; die castings provide this combination. We have just received our first shipment of die castings and are very pleased with the results of our first venture in using die castings."—Alfred Zuckerman, Chief Engineer, David Bogen Co., Inc., New York, N.Y.

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Continued next page

Here's What They Say . . .

"As a product progresses saleswise," according to E. Mahoney, Chief Engineer, Johnson Farebox Co., Chicago, Ill., "we may switch to die castings from sand castings. The primary reason is economy. As the demand for any product increases, it is natural to look for ways to cut costs. We have used die castings for this purpose for many years; according to our purchasing department records, the first die castings were bought about 1916. Die castings eliminate a great deal of machine work such as milling, and may sometimes be more economical even for small quantities of parts."

•

Substitution of die cast aluminum and zinc for malleable and gray iron castings is taking place in new products of H. D. Hudson Mfg. Co., manufacturers of farm apparatus such as sprayers, dusters and equipment for barns, poultry and livestock.

•

"Anyone who has used gray iron castings over a long period of years, especially where complicated core work is involved, will find the change to die castings a great improvement. In one of our new products, for example, a zinc die casting weighing 7½ pounds has replaced a gray iron casting that weighed between 10½ and 11 pounds. The weight of the iron castings varied because no two castings were received exactly alike. Much less machine work is needed on the die cast unit. You know that the castings will be uniform, accurate and smooth when they are received."—M. Shapiro, Owner, National Safety Table Co., Merrick, N.Y.

•

"We are using die castings in two different products, i.e., our cameras and our enlargers," Alfred Simmon, Chief Engineer of Simmon Brothers, Inc. comments. "It is virtually impossible to build a precision camera by any other means because only die castings combine the possibility of complex shapes and thin walls with light weight, strength and dimensional stability. Reasons for using die castings in our enlargers are predominantly economic. Die castings not only cost less per pound of metal, but it is also possible to reduce the weight of the individual casting.

"On the other hand, we have actually had a few isolated cases in which die castings no longer offer any savings over sand castings and at least one case in which they would have been more expensive. Machining costs, while always undesirable, are today comparatively less than they were ten years ago. This is caused by the introduction of automatically cycling milling machines, multiple spindle drilling and tapping machines and similar machinery."

•

United Parts Mfg. Co. in Chicago reports an increase in the number of zinc die castings in their automotive products, principally replacements of screw machine parts.

•

Frank A. Leone, assistant chief engineer at Ditto, Inc., reports that new designs will include die castings in aluminum, zinc, brass and aluminum bronze, mainly to take the place of sand castings, welded assemblies and machined components.

"Die Castings Give Economical Quality Control . . ."

Arnold C. Zentz

Manager of Quality Control
Bell & Howell Co.

"Bell & Howell Company has been a consistent user of die cast aluminum parts in cameras and projectors since the middle of 1920 when the mass production of amateur movie equipment first began. Since that time die cast parts have been the major bulk of our products and form a large segment of the total material and labor expenditures which go into the amateur projector and cameras.

As the market for this equipment grew and as new markets developed in the 8mm field, the volume of production increased and with it has increased the use of die cast parts so that today almost every item manufactured for commercial and military use is basically housed and retained with die cast parts.

The trend in recent years has been not so much as from sand cast or fabricated construction to the die casting field but from the standpoint of improved quality, of reducing operations on parts by attempting to die cast to closer tolerances and with better finishes. We are continually requiring that surfaces be flatter, that dimensions be held closer and finishes be better with the result that our quality control problems have been manifold.

However, the resulting savings in eliminating machining operations on castings by attempting to procure castings of better quality and with closer dimensions is so great that the additional effort is recovered many times. Only in this way can we meet and continue to meet the severe competition in this industry, both domestically and from abroad.

Since the amateur camera and to a lesser but also important extent the amateur projector are a rather personal item, the appearance and finishes on these products must be of unusually good quality. The requirement that castings be chrome plated with a matte satin finish on highlighting beads is a severe test of the aluminum die casting process since the slightest mark will show up after the plating and polishing operations.

The uses of various paint finishes, some in the wrinkle family and some smooth finishes require extremely smooth and clean surfaces below the preparation treatment to avoid beauty defects which are immediately visible to the customer.

This extensive use of die castings is an indication of the importance of appearance to our product. Die casting is the only way we can get this appearance and economical control of quality."

PMM

DIE CASTING FORECAST ISSUE

HERE ARE SOME OF

TOMORROW'S DIE CASTINGS

Automobiles: More and larger die castings were used in automobiles in 1955 than ever before. This has kept American die casting machines shooting metal at the greatest pace in history. Since the builders of cars are the biggest customers of the die casting industry, the question naturally arises: "Will the auto industry use as many die castings in 1956?"

A check with several major die casters reveals that 1956 models will carry somewhat greater numbers of die castings than previously. In general, body styling will remain unchanged but a "new look" will be gained by changes in trim and accessories . . . mainly die cast in zinc.

Big feature of this year's models has been a trend toward die cast zinc grilles and front end hardware, a trend that will gain impetus in the new models. Likewise, some cars will be using more die castings on dashboards, luggage compartments, hood ornaments, etc.

Biggest factor in 1955 has been, of course, the record volume of car sales. Not only have more die castings been used per car, but more cars have been sold. With the modest increases in number of castings to be used per car in 1956, and with every prospect of auto sales at the same or higher levels, the die casting industry expects to set a new record during the next twelve months.

For Example: One of the 1956 models soon to be introduced will feature a newly designed instrument cluster housed in a zinc die casting weighing more than five pounds; the former design used only some small bezels totalling between 1½ and two pounds. A major truck builder has extended the size of the decorative model escutcheon appearing on the front fenders: result will be three pounds more of zinc die castings per model.

The 1956 Lincoln, just introduced, includes many die cast components, both decorative and functional. The hood ornament illustrates a use of rich combination plating colors . . . gold and chrome. Many of the safety features which will be highlighted in this year's selling campaign employ major die cast components.

Photos: Lincoln Div., Ford Motor Co.

MORE NEW DESIGNS

Photo: Du Wel Metal Products, Inc.

Television: The forest of television antennae that has sprouted from America's rooftops is evidence of the importance of this youngest member of the communications industry. If statistical proof is needed, the sale of TV sets during the first five months of this year soared 13 percent above the comparable period in 1954. During the January-May period of 1955, a total of 2,667,630 sets were shipped.

Product designs have become stabilized, annual sales can be predicted with reasonable accuracy, and the competitive situation has tightened. All of these favor the use of die castings, where tooling for long production runs is economical. Die castings also offer the best means of "dressing up" TV sets with hardware trim.

For Example: Motorola, this year introducing a new emblem which will be used to identify its line of communications products, is featuring die cast zinc with combination plated and painted surfaces to accent their 1956 TV sets. The four die castings illustrate the combination of decorative and functional purposes served by these plated die castings set off by touches of black and red paint. The two long die castings, cast with carefully controlled curvature, will clamp the picture tube in place.

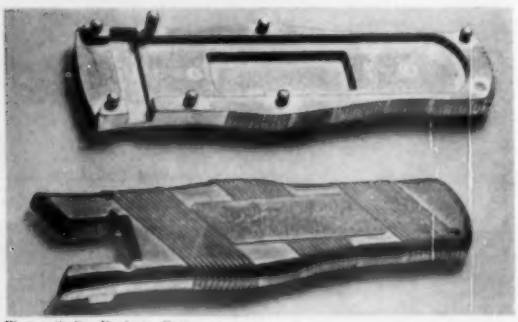


Photo: Stella Products Corp.

Sporting Goods: The light weight of aluminum die castings has made them almost standard material for such fishermen's equipment as fishing rod handles and reels, but there is also an important place for zinc die castings among the equipment manufactured for hunting, fishing and other outdoors sports. Very often, the weight and mass of the zinc alloy can be utilized, as well as its plateability or other special properties.

For Example: A knife that cuts, scales and weighs fish is one of the new sporting goods products on the market. This Fishweigh Knife, manufactured by the Cary Corp., is constructed of a 4½" stainless steel blade and a sturdy handle composed of two zinc die castings. In addition to performing the usual functions of a good, sharp knife, this device can be used as a beam scale to weigh fish from one to nine pounds.

The handles are precision die cast, weighing 8.0 ounces within a tolerance of ±0.2 ounces because of the accuracy needed for the knife to weigh properly. Cast bosses and studs are integrally formed for easy assembly; the cast bosses go into cored through holes and are struck in a power press to rivet a permanent joint. Coring in the die is the most economical way to provide places for the spring and release lever, the blade, and a slot around the periphery of the joined die castings to take the wire handle.

Special Purpose Machinery: The limited quantities sometimes thought of as a handicap that prevents the use of die castings in special-purpose machinery is mostly imaginary. In the first place, the shapes of components in such equipment are often so complex that the money saved in machining will save the cost of die casting tools over a very short run. Also, some special-purpose machines that have applications in retailing or other commercial establishments are likely to be produced in respectable quantities over long periods of years, making tool write-off a negligible factor.

For Example: Key-making machines are commonplace devices in hardware, specialty and other retail stores. National Key Company, in manufacturing these special-purpose machines, uses six zinc die castings. Here, a smooth and attractive exterior is as important as the accuracy and detail of the internal features. The parts go together to form the main part of the machine's structure.

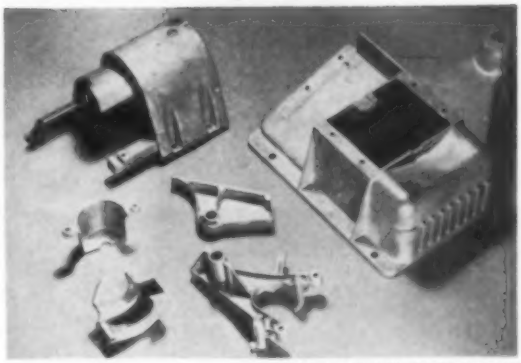


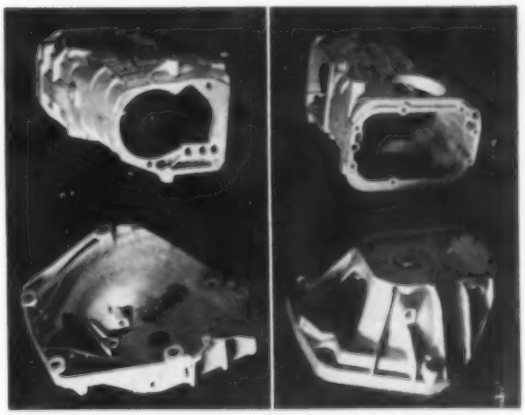
Photo: Tool-Die Engineering Co.

European Production: European manufacturers are including die castings in their plans, just as their American counterparts do. The auto industry in Europe, while not keyed to the same quantities of production which have made car builders in the United States rely so heavily on die castings, still makes important use of die cast components in large quantities.

The automatic transmission, a popular feature of today's automobiles, demands aluminum die castings for principal structural elements.

For Example: Outstanding illustration of the quality die castings going into European motor cars are these two large components, shown in front and rear views, produced in the Fiat Stabilimento Fonderie in Torino. These are the gear box housing and the related support casting used on the engine of the type 600 Fiat.

These heavily-ribbed, well designed housings are strong and rigid enough to withstand the severe loading and stresses applied to them.



Photos: Fiat Stabilimento Fonderie

Die Casting As A Means of Assembling: One of the new and interesting uses for die casting is to make ultra-precise assemblies of other components, such as screw machine parts and stampings. By using a special machine that injects a fraction of an ounce of low melting metal, assemblies of shafts and gears can be put together in 5 seconds with essentially perfect concentricity. This specialized application of the die casting art calls for special tool-making skill, but saves thousands of dollars of machining and assembly time on the production line.

For Example: Every gear and pinion in this electric meter gear train is assembled onto its shaft quickly and economically by die casting. Now used by Westinghouse, General Electric and other meter manufacturers in United States and Canada, the method is now being considered for bench assembly in other industries

Continued next page

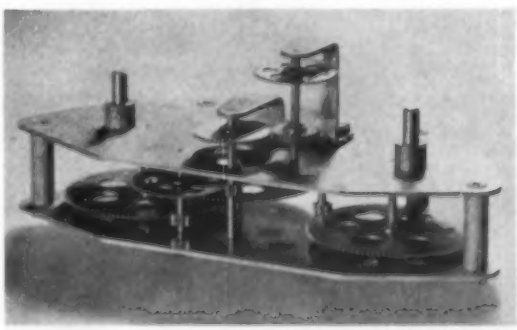


Photo: Fisher Gauge Works Ltd.

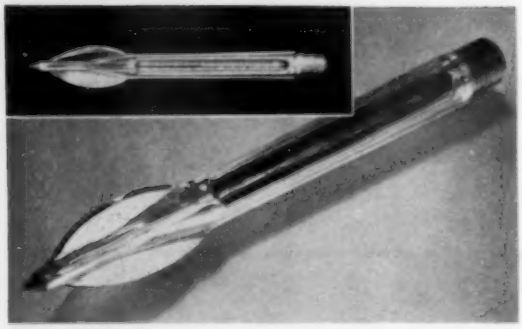


Photo: Tinker Mfg. Co.

Agricultural Devices: Farming is one of America's biggest businesses and has developed a major industry to supply it with necessary mechanical goods. Tractors, reapers, binders and other heavy equipment have long made use of die cast components. Many specialized tools and products have also been developed for use on the farm, but until relatively recently, quantities in which these were manufactured discouraged introduction of die castings. Now, an entire group of small, special tools has come on the market produced with the economy, accuracy and smooth finish permitted only by die casting.

For Example: The hazard of fire in barns where hay is stored has resulted in the development of a special hay thermometer which can be used to probe into the center of the hay or grain. Tinker Manufacturing Company uses an aluminum die casting with stainless steel blades for the head of the hay thermometer. The blades, cast as inserts in a two-cavity die, help to cut into the center of the hay mow. The blades are blanked and ground, inserted in the die, and aluminum cast around them. The interior is cored out and the external threads are cast, ready for cleanup with a thread chaser. Brazing or butt welding the blades to a steel body was considered for manufacturing, but these would have taken more time or been more expensive.

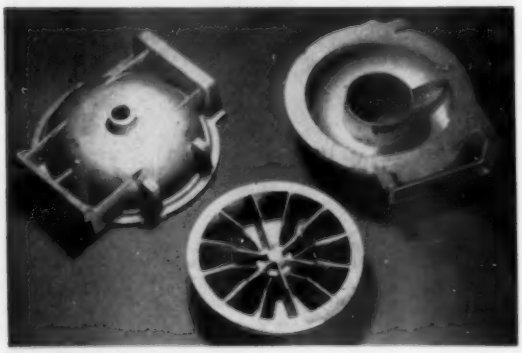


Photo: Maytag Co.

Household Appliances: Second only to the automobile industry in quantity of die castings consumed is the household appliance industry which uses these castings as a means of precision manufacturing on a large-volume scale. Die castings can truly be called a key to America's high standard of living, because it makes possible the production of complex mechanisms at low cost. Tomorrow's washers, dryers, vacuum cleaners, fans, air conditioners, ranges, refrigerators, deep freezers and other appliances make important use of die castings in all alloys.

For Example: Next year's Maytag home appliance type dryer will incorporate these die castings which, at the time PMM went to press were not yet in production. These three castings are sand cast prototypes of parts which will soon be made on large scale as die castings. They are an impeller for an extractor pump, and a front and rear cover for the pump. These illustrate the mechanical, functioning components that combine strength and accuracy of die castings.

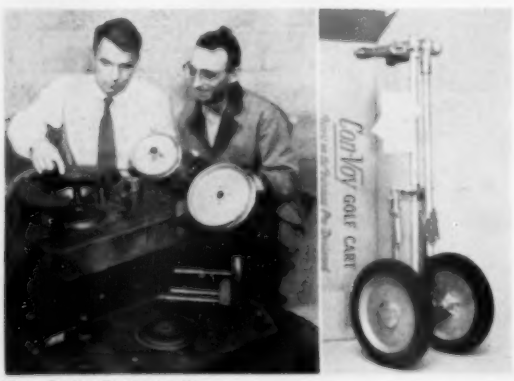


Photo: Product Engineering Co.

Unusual Tooling: One reason so many designers call for die castings is the almost unlimited range of shapes made possible by the high level of skill among die casting die makers. The ability of the die maker in making unusual tooling is responsible for some of today's outstanding die castings.

For Example: A 3-segment collet die (in place of the ordinary 2 piece core for casting undercuts around the perimeter) produces a perfectly concentric die cast aluminum wheel for the Con-Voy golf carts manufactured by Product Engineering Co. of Portland, Ore. These new die cast wheels replace pressed steel ones, giving greater strength, particularly around the hub. Inherent weakness of the pressed steel wheel is the bearing socket which bears the full weight of the payload on a rounded drawn surface of thin sheet metal; the die casting with cast tubular hub section gives full support.

For the Children: Everybody uses die castings . . . even the kiddies. With Christmas in the offing, attention is centered upon some of the new toys that make use of die castings. Toys that function like their real counterparts generally have die castings in them. And where durability is required, die castings are essential. Surface detail, attractive shapes, realism and safety factors all are reasons for the preference for die cast toys and novelties.

For Example: Cap pistols and other toy weapons are traditionally die cast in zinc, but a new one is this realistic rifle with telescopic sight. Although the stock of this "weapon" which fires caps and gives off smoke, is molded in plastic, all working parts are die cast in zinc (see the closeup). It will resist the roughest cowboys and Injuns competition. This gun, like the toy trailer-truck, tractor and self-propelled automobile, are all manufactured by the Irwin Corporation of Nashua, N.H., and depend upon the sturdiness, precise detail and quality of die cast zinc. The three vehicles are attractively finished with bright colored organic coatings to enhance their child-appeal (and parent appeal). Some of these toys, like the trailer-truck, is constructed of a number of die cast components that work together realistically, such as the sliding truck door, tailgate, wheel construction, etc.

Photo: Irwin Corp.

Photo: Gries Reproducer Corp.

Tiny Die Castings: In a class by themselves are these tiny die castings. The unlimited variations in shape made possible by molten metal flowing into a steel die in rapid cycles has made a great trend toward conversion of small stampings, screw machine parts and sand castings into die cast zinc. Combinations such as gears with pinions, gears with shafts, cams with wheels, are less costly and more accurate when die cast. Toys, instruments, cameras, appliances, hardware, switches, business machines all include one or more examples of these miniature die castings.

For Example: None of the 31 die castings grouped here weighs more than half an ounce. They pop from the die casting machine trimmed, clean and ready for assembly. Some of the contours are extremely complex, many have very small holes cored accurately through them. Gears of all sizes, shapes and configuration are practical by this method. Parts included are: electrical and electronic equipment (parts for control devices, circuit connectors, thermostats, timers, switches, etc.) and toy parts (used in musical instruments, dolls, tea sets, air rifles, games, etc.)

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DIE CASTING FORECAST ISSUE

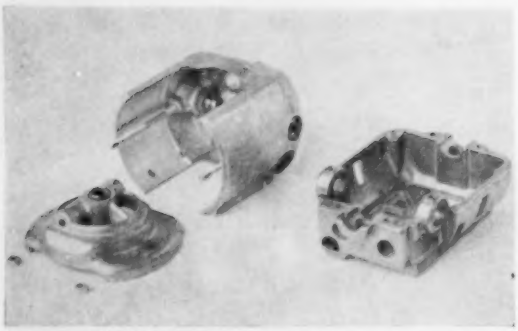

Photo: General Electric Co.

Electric Motors: Redesign of components that have long established as die castings is an interesting feature of the current trend toward cost-cutting. Sometimes, redesign will make better use of the advantages of die casting than the original die cast designs. Electric motors, long a user of die cast aluminum, have design improvements in new models. **For Example:** General Electric Company is using two new die cast stators that are redesigned from previous die castings to require minimum machining. The new die cast motor frame, *right*, is a light weight one piece unit that incorporates both stator frame and endshields. When contrasted with the older die cast model, *left*, which uses two-piece construction, it is seen that the one-piece unit utilizes only about 50 percent of the material, eliminates most machining.

A total of 15 screw holes of minimum die cast size are cored into this unit along with eight larger holes for brush holders and oil reservoirs. Rock-free level mounting is provided by three pads on the base and X-type ribbing gives added strength.

A unique eccentric arrangement in the die permits shifting of the cast brush holder holes for either 2 or 3-speed regulator. Cast V's provide three-point stator suspension, and two slots are cast for the stator spring retaining clamp. Critical features are cast to close tolerances by having them all in the ejector half of the die.

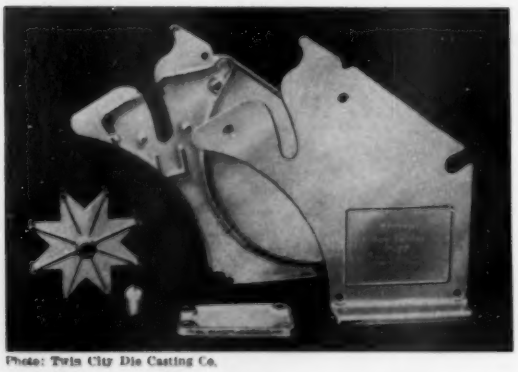

Photo: Twin City Die Casting Co.

Complete Products: It is becoming common practice nowadays to build products entirely, or almost entirely of die castings, getting the economy, precision and appearance of die castings for all components. Design, production, purchasing and inventorying are all simplified.

For Example: Five components, virtually the complete unit, which make up this bag sealer made by Specialty Manufacturing Company, are die cast. This includes side plates, tape drum, spring cap and mounting plate, all designed originally as die castings.

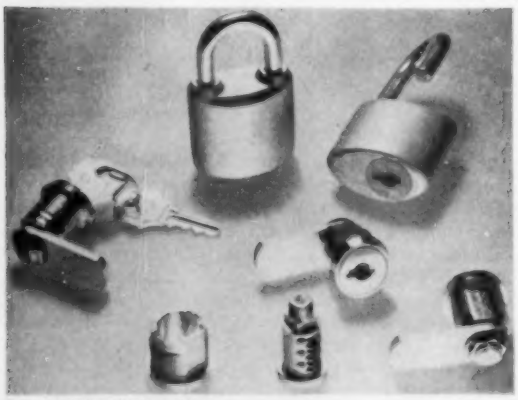

Photo: American Hardware Corp.

Hardware: Whether you think of hardware as the items on the shelf of the neighborhood hard-goods store, or the built-in components that make doors, closets, windows, screens and other architectural gadgets work properly . . . chances are that die castings are important components. Take aluminum storm doors, most of them have die cast aluminum hardware; folding-type doors, commonly have die cast working parts; casement windows, almost always opened, closed and locked with die castings; or venetian blinds, hardware courtesy of die casting. **For Example:** Two lines of locks made by The American Hardware Corporation are products of the die casting machine. Cylinder locks (built of the two extremely precise die castings shown in the fore-

Continued on page 95

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PMM DIE CASTING FORECAST ISSUE

WITH AUTOS USING RECORD TONNAGES OF DIE CASTINGS

HOT CHAMBER MACHINE SALES

A POWERFUL burst of activity in the automobile industry starting about the time the 1955 models went onto the production lines, has continued unabated throughout the current year, and has had heavy impact upon the sale of die casting machines. It has, in fact, reversed a trend.

Up to mid-1954, a slow but steady downward trend was noted in the percentage of sales of hot chamber machines as compared with cold chamber units. Between 1952 and July 1954, hot chamber machines, used for die casting zinc, dropped from 52.8 to 49.7 percent of total die casting machine sales. Both types of machines were being sold in increasing numbers, but cold chamber machines were gaining ground more rapidly.

However, the heavy emphasis on chromium plated zinc die castings in the 1955 cars has swung the balance back to zinc. The figure 49.7 percent reported by PMM on the basis of the first half of 1954, was no longer true by the end of the year. Hot chamber sales for the entire year represented 52 percent of the total.

The record output by the die casting industry in 1955, the prospect of an equally good or better 1956, and the increasing poundage of zinc used per car, has kept the sale of hot chamber machines rising; for the first six months of this year, zinc machines accounted for 63 percent of all machine sales.

Can this be expected to continue? As one machine builder told PMM, recent new orders for 31 machines . . . all hot chamber . . . and two additional orders pending, would keep his plant busy until the middle of 1956 meeting current demands.

But the trend reported above is only a *percentage* trend. Cold chamber machines are also being sold in *increasing numbers*, as evidenced by the projected total of 174 for 1955 (based on first six months figures) compared with 1954's sale of 145 cold chamber units.

Machines for die casting zinc, on the other hand, show an almost 100 percent increase over 1954. The projected 1955 total of sales is 298 machines, compared with 157 in the preceding year.

Total annual sales for all types of die casting machines has more than doubled since 1952, with every prospect of increasing during 1956. Some machine builders are expanding their manufacturing facilities to meet the growing demand.

Some technical developments in machine design, furnacing and machine components may have a major influence on future trends, not only in the sale of machines, but in the end uses of die castings. Some of these developments which may affect the over-all picture of die casting production and sales are mentioned on page 56 under the heading of Trends in Equipment.

What about machine capacity? Biggest gain in machine sales has been in the large capacities . . . machines having locking pressures above 500 tons. Jobbing die casters find a growing demand for castings in the large size range. Examples of these oversized castings come not only from the automotive industry with its die cast zinc grilles and die cast aluminum torque converter housings, but there is also a trend to replace large sheet metal housings and plas-

HOT CHAMBER VS COLD CHAMBER	1952	1953	1954	1955*
Hot Chamber	52.8%	53.1%	52%	63%
Cold Chamber	47.2%	46.9%	48%	37%

*Based on first 6 months reported.

NEARLY DOUBLE

tic moldings in the appliance industry. These trends must be met with larger capacity machines.

As one midwestern die caster commented, even when he has trouble keeping average-size machines fully loaded with work, the larger machines can't keep up with the demand.

Holding their own are the hot chamber machines in the smallest size range. Despite a surge in the buying of large machines, the greatest number of machines sold in any one category are those having less than 100-ton locking pressure.

Versatility of these small units is generally credited with their steady popularity. Jobbing die casters, for example, report that one or two small machines help to balance the work on the larger machines, taking jobs which are often uneconomical to run on full-size die casting machines.

Foreign sales a factor. Some manufacturers of die casting machines have shipped machines abroad. Although information is not generally available concerning countries to which machines are shipped, Germany and Japan have been important customers for American machines in the past.

Sale of hot chamber machines abroad has been limited to the smallest capacities; aluminum machines in several sizes are sold, but principally below 400 tons. However, a number of die casting machines manufactured in Europe provide competition for the several American builders interested in that market. With domestic sale of machines at record levels, few machine manufacturers have made a serious effort to export machines.

How accurate are 12-months predictions that are based upon projection of first half totals? The overall picture seems to indicate a reasonable degree of accuracy. Last September PMM reported annual sales estimated at 150 hot chamber and 156 cold chamber units; actual production figures now show 157 hot and 145 cold chamber units. Greater variations occur within given capacity ranges, but total number of machines shipped by twelve manufacturers is within four units of the predicted total.

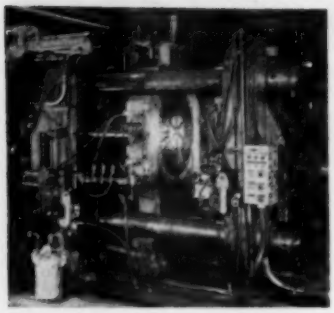
SALE OF DIE CASTING MACHINES IN THE UNITED STATES

	Tons	1952	1953	1954	1955*
HOT CHAMBER	-100	52	64	73	90
	101-250	16	16	15	36
	251-400	5	27	8	32
	401-500	19	22	41	40
	501-750	5	20	20	80
	751-1000	4	4	—	20
	Total	101	153	157	298
COLD CHAMBER	-100	4	1	4	8
	101-250	12	16	19	8
	251-400	38	43	28	34
	401-500	17	27	37	26
	501-750	21	39	57	80
	751-1000	5	16	—	18
	Total	97	142	145	174
TOTAL HOT & COLD	-100	56	65	77	98
	101-250	28	32	34	44
	251-400	43	70	36	66
	401-500	36	49	78	66
	501-750	26	59	77	160
	751-1000	9	20	—	38
	Total	198	295	302	472

DIE CASTING MACHINES SHIPPED OUTSIDE THE UNITED STATES

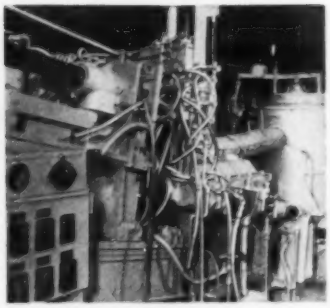
	HOT CHAMBER		COLD CHAMBER	
	1954	1955*	1954	1955*
-100	45	130	11	8
101-250	12	2	11	14
251-400	5	—	10	4
401-500	2	—	2	—
501-750	—	—	3	4
751-1000	—	—	—	—
Total	64	132	37	30

*Based on first six months reported.



LARGEST die casting machine may soon be producing complete engine blocks in aluminum.

SMALL bench-size die casting machine is used to assemble gears, shafts, pivots, etc.



HOT CHAMBER magnesium machine is in production; while hot chamber aluminum may be soon.

PMM

DIE CASTING FORECAST ISSUE

TRENDS IN EQUIPMENT

GROWTH of the die casting industry during its first fifty years was principally based upon the skill and ingenuity of its tool and die men . . . the designers and builders of dies that could produce larger, more complex, better-surfaced and sounder castings to meet the needs of more and more types of products.

Did a product require intricate oil holes? Hardware quality surfaces? Dozens of holes in several surfaces? Exceptionally large castings? Dimensions held within a few thousandths? Especially thin sections? If so, the die makers of the industry could find a solution.

At the same time, there have been some technical advances in the industry such as the development of zinc alloys having suitable physical properties and aging characteristics, use of smelters' aluminum alloy on a par with primary metal, extension of the size limits of die casting machinery, and many others.

During the past year or so, there have been signs that new technological developments will give the industry a boost.

Since the announcement of the development of a hot chamber machine for die casting magnesium, two machine builders have been licensed to manufacture. While great interest has been demonstrated, so far only one machine has been manufactured and put into production. As soon as the pressure to meet demands for standard zinc and aluminum machines has eased, machine builders expect the interest in the new magnesium unit to materialize into orders for machines. Significance of this development is the possible increase in use of magnesium as a die casting alloy.

Similar developments in the aluminum die casting field may also be completed soon. Work is known to be in progress on the hot chamber casting of aluminum, although the Dow machine cannot be used for this purpose. These new developments hinge upon a new material for the gooseneck. The implications of this development, if successful, are of greatest significance to producers and users of die castings.

New developments in the realm of die casting machines, other than the refinements in construction and operation of standard models, are worth watching.

On the large end of the scale, the new 2,000-ton die casting machine announced last year is being tested on extra large die castings. One original objective in building this large machine was the die casting of automotive engine blocks. While it is understood in the industry that work is progressing satisfactorily in this direction, company officials would not confirm such reports. This machine has 72 inches between tie bar centers, and casting capacity of 75 pounds of aluminum, 200 pounds zinc.

At the other extreme, a small, specialized die casting machine has recently become known as an assembly unit. This unit has been used for a number of years by major manufacturers of electric meters to assemble pinions, gears, shafts, pivots and other components in 5 seconds by shooting about .1 cubic inch of die cast metal. The limits on concentricity are extremely close, and wider use of this for small. bench assemblies is foreseen.

Furnacing has been the subject of considerable development work. Central melting systems connected by launders to each die casting machine has been

Continued on page 96

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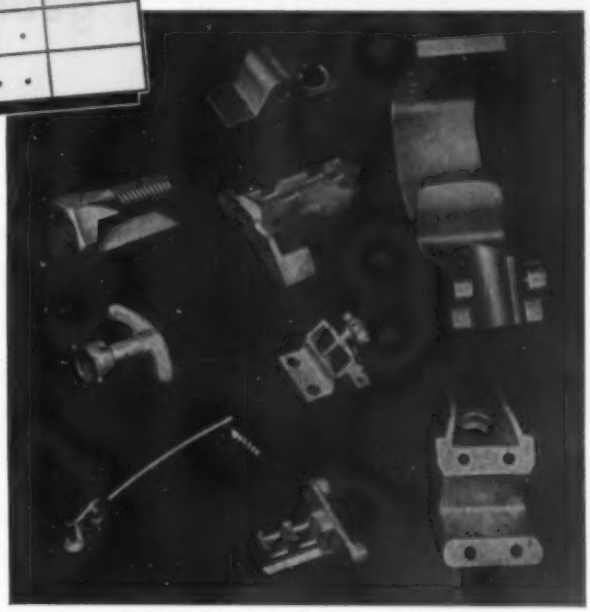

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AMERICAN DIE CASTING INSTITUTE

27th Annual Meeting Program

TUESDAY, SEPTEMBER 13, 1955

Meetings of Board of Directors

WEDNESDAY, SEPTEMBER 14, 1955

10:00 A.M. — **Business Meeting for Members**
Annual Reports of Officers
Reports of Regional Group Chairman
Review of Certified Zinc Alloy Plan

12:30 P.M. — **P M M Luncheon**

2:15 P.M. — **Business Meeting for Members**
Product Standards Review
New Engineering Standards
First Metallurgical Standards
Commercial Practice and Trade Custom Standards

3:30 P.M. — **Public Relations Program**
Review of Activity; Methods of Tie-In Promotion; 1956 Plans

6:30 P.M. — **ADCI Annual Cocktail Party**

7:30 P.M. — **1955 Annual Banquet**
Presentation of ADCI Annual Doehler Award
Guest Speaker — Charles Pack

THURSDAY, SEPTEMBER 15, 1955

9:45 A.M. — **Metal Industries Discussions**

Zinc: "What kind of a zinc market does the die caster face in 1956?"

C. R. Ince, Vice President—St. Joseph Lead Company

H. I. Young, President, American Zinc, Lead & Smelting Co.

Aluminum: "In today's Aluminum Market where does the die caster fit for an assured supply at economically competitive levels?"

Secondary Aluminum:

E. R. Bergman, President—U.S. Reduction Co., President—Aluminum Smelters Research Inst.

R. K. Beck, President—Apex Smelting Co.

Primary Aluminum:

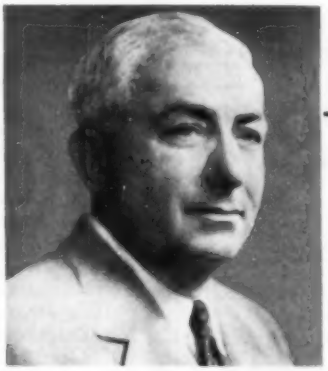
Don Wilmot, Vice President and Assistant General Sales Manager, Aluminum Company of America

DIE CASTING RESEARCH FOUNDATION

12:30 P.M. — **Annual Luncheon**

2:00 P.M. — **Business Meeting for Members**
Review of Research Projects on Die Materials and improved lubricants for High Melting Point Alloys at Battelle Memorial Institute
Plans for new research program

Charles Pack
Winner-1955
Doehler Award



DIE CASTERS STUDY METAL SITUATION

WILL there be an adequate supply of zinc and aluminum at stable prices in 1956? This question will be probed in a series of discussions that will highlight the annual meeting of the American Die Casting Institute in Chicago, September 14-15.

With first half production figures indicating new highs in both zinc and aluminum — to levels far beyond original optimistic predictions — questions of metal market conditions in the fourth quarter and in 1956 are of prime importance to the die casting industry.

Institute spokesmen point out that aluminum requirements for die casting are currently running 53% above 1953 and almost 75% over 1954 levels. The steep acceleration of demand for aluminum die castings is continuing and 1956 commitments indicate another sharp jump in consumption.

The Institute's successful request for reduction of stockpile 'take', while of some help in easing the current situation, leaves the question of supply in 1956 unanswered. Continued export of scrap and related factors plague the secondary market. With increasing demand for aluminum die castings the question of primary ingot availability is probably the most important factor in overall supply.

"In today's aluminum market where does the die caster fit for an assured supply at economically competitive levels?" is the topic of key discussion.

Don Wilmot, vice president, Aluminum Company of America, will present his company's views on the subject. For the secondary aspects of supply R. K. Beck, president, Apex Smelting Co. and E. R. Bergman, president of U.S. Reduction Co. and of the American Smelters Research Institute will talk.

In spite of the resurgence of zinc in automotive industry applications, which indicate that total 1955 die casting consumption

Continued next page

Titan

brass pressure die castings

- cut fabrication costs
- simplify secondary machining
- are made in complex shapes
- have consistent uniformity
- allow large weight savings
- increase production rates

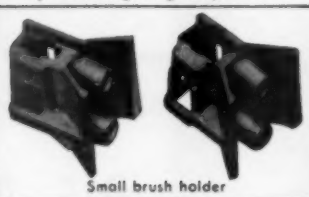
A pioneer in manufacture of brass pressure die castings, Titan can supply these parts to meet your requirements. Little or no secondary machining operation is needed on Titan pressure die castings. Intricate shapes and deep cored holes are readily produced, are consistently uniform. To save weight, wall sections as thin as .070 inches are generally feasible; but 1/32 inch section is possible if not too large in area. Machine scrap is reduced, and your fabrication costs cut. Moreover, the better surface finish, sharper outlines, greater accuracy, higher strength, and finer grain structure of Titan brass pressure die castings make them unquestionably superior to sand and other types of castings.

Anyone of these versatile advantages may be reason enough to specify Titan brass pressure die castings as components in your finished product. Find out what Titan can do for you.

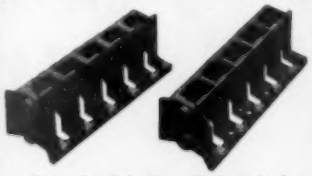
VISUAL PROOF

These photos demonstrate how little secondary machining is required on typical Titan pressure die castings. In each case a part as cast and trimmed only, and the same part machined are shown.

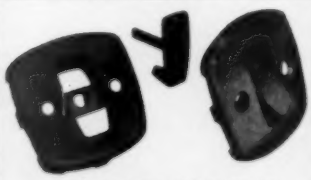
Flywheel for garbage disposal unit



Small brush holder



Large brush holder with broached holes held to close tolerance



Overflow plate and trip handle

Shower head

Send for 12-page booklet on Titan brass pressure die castings

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will exceed 1953's all time high by 25% and will run 50% above 1954, the die casting industry is aware of the need for stability in the zinc market if these gains are to be held. 1956 and 1957 production plans are high but recent market developments are causing concern.

C. R. Ince, vice president, St. Joseph Lead Company and Howard Young, president, American Zinc, Lead and Smelting Company will discuss "What kind of a zinc market does the die caster face in 1956?"

Six Engineering Standards

At earlier business sessions ADCI members will review the Product Standards Program. This program, announced at last year's session, is moving rapidly. The first five Engineering Standards were published in March 1955 and at this meeting the Institute will announce six additional "E" Series Standards. These will cover: Depth of cored holes, Draft requirements for cored holes, Cored holes for tapping, Ejector pin marks, Flash removal, Machining stock allowances.

The Metallurgical Series "M" Standards are being prepared for publication and in this series the following will be reported: M-1—Alloy cross reference charts, M-2—Composition and properties of standard aluminum alloy die castings, M-3—Composition and properties of special aluminum alloy die castings, M-4—Characteristics of aluminum alloys.

The "C" Series covering historic "Commercial practice and trade customs" will also be announced. This series, based on a review of sales practices over the last quarter century, covers industry custom on escalation clauses, dies and tools, acceptance and delivery detail and other contractural provisions of importance to purchasers.

A public relations session will review the ADCI activity in this field. The success of the die casting clinic exhibit program, which is sponsored nationally by the Institute's Regional Groups, will be reviewed as will the use of the American Zinc Institute film "Die Casting—How Else Would You Make It?"

Continued on page 98

These basic suggestions will help you

When You Buy Investment Castings

By CHARLES T. SLOAN
Chief Engineer
Alloy Precision Castings Co.

ONE of the most important services of a producer of investment castings, is to aid customers to design parts that will meet their specific requirements. Since many companies do not realize the inherent advantages of the investment casting process, it is the job of the producer to assist in designing specifically for investment casting, and thus enable them to realize the full potential of the process.

To do the best job possible, the producer must be furnished with certain information from the customer. Where such information is not forthcoming, delays occur, and it is not always possible for the producer to effect maximum economy in the overall production of the part.

This report is designed to aid customers in the original design and specification of a part for investment casting. It will be of use to both design engineers and purchasing personnel, and points up those most commonly overlooked considerations in the specifying of investment cast parts. With such information, the producer can thus turn out the best possible part which will meet all customer requirements at the lowest possible cost, and on a proper delivery schedule.

To the producer of investment cast parts, needed information falls into three main categories; (1) design features, (2) metallurgical requirements, and (3) inspection standards.

Under the category of design features, the producer must be told of the dimensional tolerances necessary for the part. He must also know the wall thickness and the surface finish requirements. Since the quantity of the order determines the type of die to be used and the production scheduling, such information must be furnished as soon as possible.

From this basic information, the producer is then able to determine whether the fillets are correctly proportioned to the design of the casting; whether wall thicknesses are correctly proportioned for good physical characteristics such as shrink, hot tears, and the like.

He is also able to determine whether the tolerances given are practical.

Continued on page 103

12 TIPS FOR DESIGNERS AND BUYERS

1. Avoid blind holes wherever possible; blind holes are much more difficult to cast and of necessity, will add to the cost.

2. It is not advisable to specify cast threads. These can be produced more economically as a secondary operation.

3. Try to maintain uniform wall thicknesses around the entire casting. This aids in producing a sounder finished part.

4. In round or flat pieces, always allow for machining where fits are required.

5. Incorporate ribs in casting design wherever possible; these allow for a sounder casting.

6. Investigate the possibility of combining several components into one casting. This affords a better integrated unit, minimizes final machining, subsequent assembly operations.

7. Do not specify closer tolerances than are absolutely necessary because this makes the part more expensive and often delays delivery.

8. Indicate general tolerances on unimportant dimensions; specify close tolerances only on the essential dimensions.

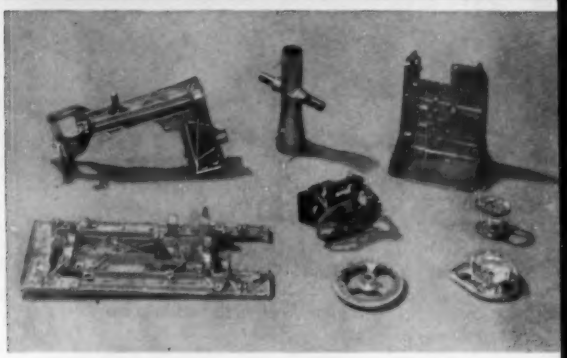
9. Specify surface finish only where absolutely needed.

10. Indicate where machining is allowed and how much. This allows the producer to make a casting with sufficient machining stock.

11. In determining the final tolerances, where close tolerances are desired, it is best to consult with the producer to arrive at an understanding. Sometimes, a rearrangement of the dimensions makes possible a better casting.

12. The producer should be given as much information as possible, about the end use of the product. This enables him to study all aspects governing the part's expected performance, and to call on his past experience with similar castings.

You Can LOWER COSTS with PRECISION DIE CASTINGS

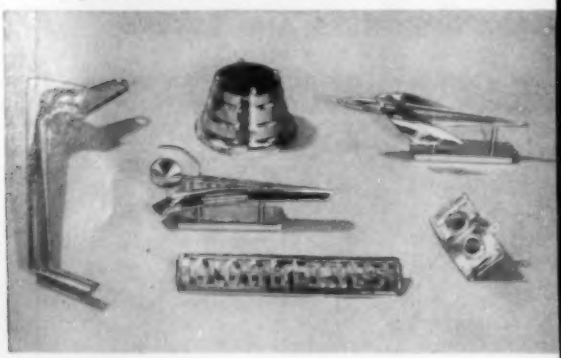


COMBINE PARTS INTO ONE DIE CASTING

Substantial savings in production costs can often be realized by combining several parts into one Precision die casting. You save not only on the cost of the parts but also assembly costs are eliminated.

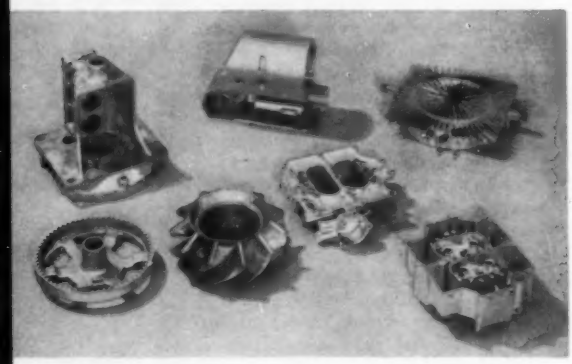
REDESIGN PARTS FOR MORE ECONOMY

Parts formerly produced by other methods can be redesigned for low-cost die casting. Even present die castings may be redesigned for more economical production.



FINISHING COSTS ARE LOW

Precision die castings can be painted, oxidized, plated or self-finished by polishing. Precision has complete facilities for finishing die castings.



DIE CASTINGS FOR FUNCTIONAL PARTS

More and more functional parts are now being die cast at great savings. Today's modern alloys plus Precision's design and engineering skills combine to produce rigid, strong, accurate functional die castings.

Call a PRECISION Engineer, Today!

*Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry

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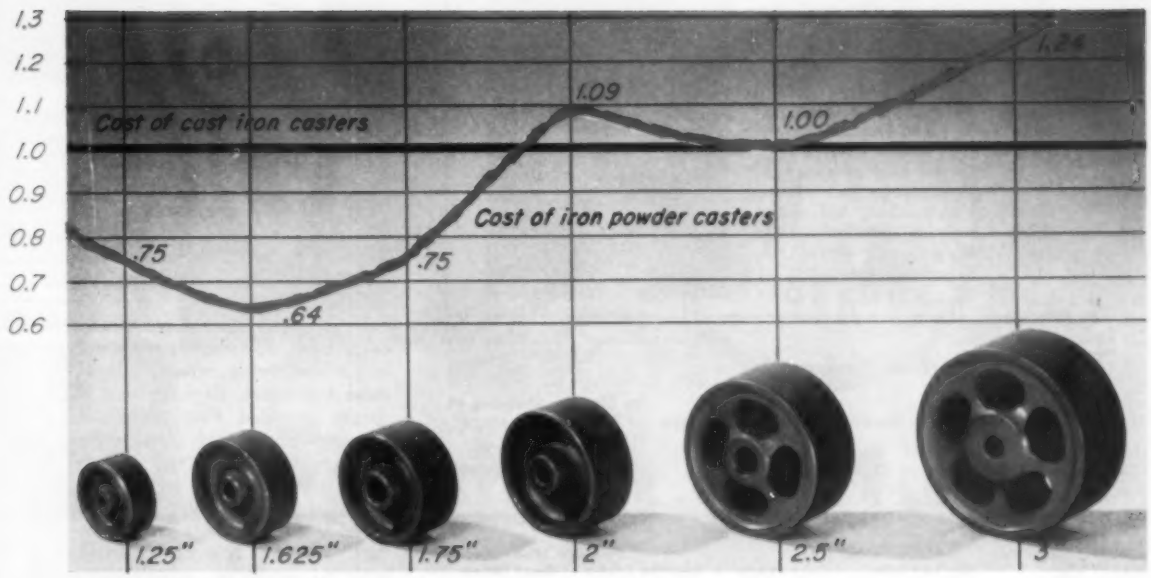

COST COMPARISON of these powdered iron caster wheels with the sand castings they replaced substantiates findings of PMM's market study published in April 1953. **Small gray iron castings, one pound and under, can profitably be replaced by the appropriate precision molding technique.** Here, a company reports that powdered iron wheels perform better and cost less in sizes up to about one pound.

Caster Wheels — Cast Iron Or Powdered Iron?

BY KEITH McELWAIN
Chief Metallurgist
Powder Metal Division, The Bassick Co.

FOR many years, the standard material for caster wheels used in service under heavy loads and severe wearing conditions was grey cast iron where a moderately priced wheel was required. Millions of cast iron wheels were used in Bassick casters and in competitive brands. They achieved wide acceptance in the industry, and for many years, little thought was given to developing a new and better wheel.

There were, however, a few people who realized that a cast iron wheel was lacking in many requirements, such as concentricity and toughness. Walter Herold, who was for many years chief engineer of The Bassick Company, and more recently executive vice president until his retirement, was the first to consider powder metallurgy as a natural method for producing caster wheels which would be concentric, self-lubricating, tough and wear-resistant.

During World War II, at Mr. Herold's suggestion, The Bassick Company set up a Powder Metal Division to insure its own supply of self-lubricating bearings used in rubber caster wheels, and to develop wheels made from powdered iron that would replace the cast iron wheels.

Development work soon indicated that with the proper combination of iron, copper and graphite, pressed at reasonable pressures, an engineering material could be produced which possessed better properties than cast iron as well as being self-oiling. This comparison can best be shown by the typical figures given in Table 1.

The cast iron strength shown is unusually high but the results were obtained from as-cast-test bars made by using standard powder metal test bars as patterns. Even though this method of testing cast iron shows off its properties to advantage, the powdered metal wheel alloy makes a superior showing.

In 1946, we started production on the first powdered iron wheel. By a gradual increase in production facilities and new tooling,

When the experts told Walter Herold that a caster wheel made from iron powder could never equal the performance of a cast iron wheel they started an investigation that has resulted in one of the most important contributions to the science of powder metallurgy. Herold and his co-workers proved that properly made iron powder parts could not only surpass cast iron in performance, but in size ranges of up to about one pound finished weight the wheels made from iron powder were also cheaper to manufacture.

1. Physical Properties Compared

Material	Density	Hardness	Tensile Strength	% Elong. in 1 Inch	Modulus of Rupture
Cast Iron	7.10 g/cc	B 101	46,400 psi	0%	105780
Powdered Iron	6.0 g/cc	B 55	52,300 psi	½%	109600

2. Costs Compared

Wheel Size	Cast Iron Weight (Oz.)	Cast Iron Cost Index	Powder Iron Weight (Oz.)	Powder Iron Cost Index
1-¼"	1.5	1.00	1.8	0.75
1-⅝"	2.0	1.00	3.4	0.64
1-¾"	2.7	1.00	5.1	0.75
2"	6.2	1.00	6.4	1.09
2-½"	12.9	1.00	11.8	1.00
3"	20.3	1.00	20.0	1.24

3. Iron Powders Compared

Iron Powders	Loss of Weight During Sintering	Rockwell Hardness "B"	Breaking Strength Pounds	% Size Change O. D.
A	1.92	28.5	6016	+0.37
B	1.92	51.2	8064	+0.17
C	2.57	45.5	2018	0.00
D	2.03	21.4	5716	+1.05
E	1.03	49.6	7728	+1.05
F	1.66	45.9	7115	+1.29
G	1.62	52.4	6130	+1.16
H	2.06	37.4	6038	+0.30
I	2.15	56.2	9115	+0.04
Regular Production	1.81	50.8	8078	+0.21

our line was expanded to its present size. At this time we have produced over 12,000,000 wheels that have been merchandised in many different types of casters.

In addition to improving the material, better dimensional control, vastly improved concentricity, and self oiling, other advantages soon became apparent. Assembly problems disappeared because of close dimensional control that could never be achieved on cast wheels.

Field complaints have practically been eliminated, with only one wheel being returned in almost ten years. Reports also indicate lessened floor wear and damage when cast iron wheels are replaced with the powder metal type.

Powder metallurgy has been given a big build-up as being an "art" and that is a very pleasant way to consider it. However, Management in 1955 is still required to value any process in dollars and cents, just as it did in 1935, and just as it will in 1975. Therefore, a cost comparison between cast iron wheels and powder metal wheels is a necessary part of this article. This comparison will be candid in its entirety, but it will not reveal our actual unit costs on either the powder metal or cast iron wheels. Since cast iron was for many years the standard

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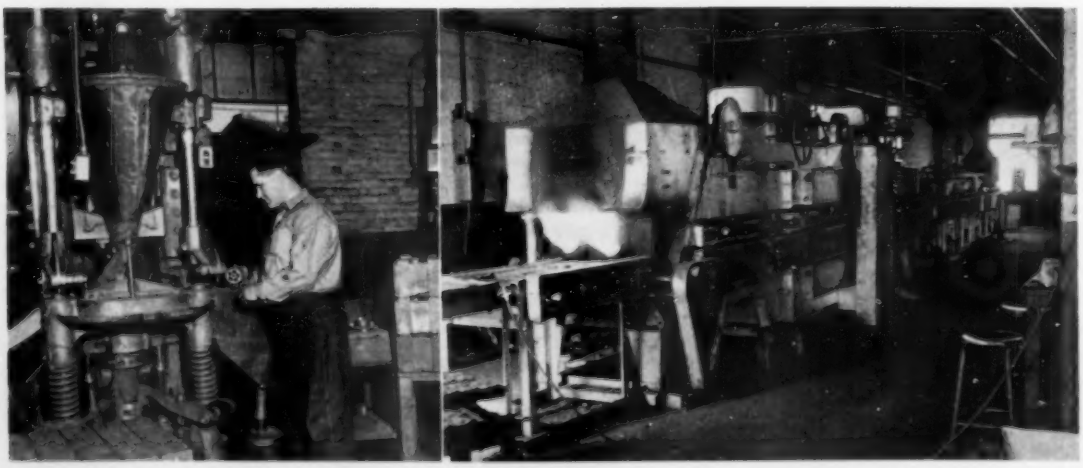
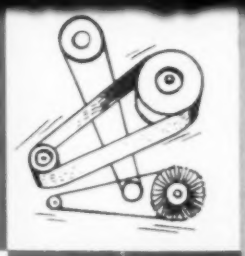
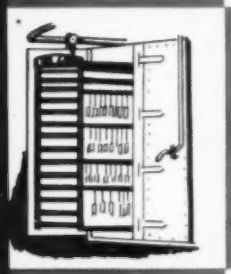
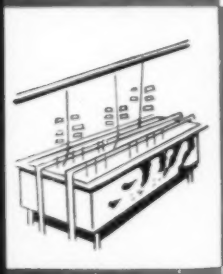
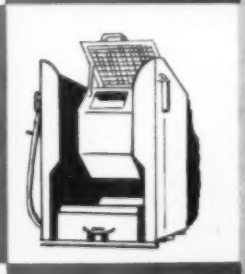


BY PRESSING AND SINTERING the proper iron powder mix, caster wheels that are better and cheaper than cast iron wheels are made. Compacting press and sintering furnace are shown above.





PMM

Finishing Section

Finishing includes all secondary operations performed on precision metal molded parts — up to and including final surface treatment. This section presents new information about the specialized methods, equipment and materials needed for finish-machining, assembly, surface preparation and final finishing of all precision metal molded parts.

devoted to the specialized problems of finishing . . .

DIE CASTINGS • INVESTMENT CASTINGS • PERMANENT MOLD CASTINGS • PLASTER MOLD CASTINGS • POWDER METAL PARTS • SHELL MOLD CASTINGS

LE ROY MACHINE CO., LE ROY, NEW YORK

COMPARATIVE FINISHING COSTS FOR JET ROTOR COMPRESSOR DISCS

FINISHING METHOD	FINISH TIME	COST PER DISC	QUALITY	DISCS PER YR.	COST PER YR.	PROD. INCR.	COST SAVINGS
FILE AND WIRE BRUSH	18 HRS.	$124.92	VARIED	231	$28,870	—	—
SUPERSHEEN DBF-200 BARREL	4 HRS.	$ 5.68	UNIFORMLY GOOD	1040	$ 5,907	450%	$124,000

1955 ALMCO SUPERSHEEN AWARD WINNER

HOW AIRCRAFT PARTS FIRM SAVED $124,000 WITH ONE SUPERSHEEN BARREL

This Almco SUPERSHEEN fixture-type barrel is paying for itself every week.

Compressor rotor discs for jet aircraft must be finished to rigid Air Force specifications at the Le Roy Machine Co., a New York manufacturer of automotive and aircraft parts. Above you see the final inspection of these parts, just barrel finished. Inspected under powerful magnifying glass, critical break-edges of the discs are right down to A. F. specs.

"Supersheen methods were largely responsible for achieving and maintaining the high quality required for aircraft manufacture," reports R. O. Braaten, Le Roy project engineer. Prior to the installation, the rotor discs were deburred by file and wire brush.

Then an Almco finishing engineer recommended that some sample discs be barrel finished . . .

In Almco's Newark laboratory, it was found that deburring these parts required tough, Supersheen bonded abrasive chips, ⅛ in. steel diagonals and abrasive compound to meet strict A. F. requirements and yet get the fastest possible cutting, grinding and polishing action.

That's how the SUPERSHEEN METHOD cut finishing time from 18 to 4 hours per disc, achieving absolutely uniform finish. Too, production was increased 450 percent, saving $124,000. annually on deburring costs.

Remember, the SUPERSHEEN METHOD is a complete barrel finishing service that begins with an Almco finishing engineer analyzing your specific problem. Then free tests are conducted on your sample parts at the Almco laboratory nearest your plant. The correct media, compounds, barrel rpm, water level and time cycle are determined in order to precision finish those parts; often a complete test can be run in a matter of hours.

Helping you select the correct size barrel or barrels for your operation is the next step. And whenever you need expert help in finishing problems, ALMCO is at your service. For further information and literature, write, Almco, 104 Marshall St., Albert Lea, Minn.

ALMCO

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SUPERSHEEN METHOD FOR *SPEED FINISHING*

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For more information circe No. 93 on the Reader Service Card

Photo: Almco Supersheen Div.

LARGE, COMPLEX CASTINGS or complete assemblies such as this 3-piece unit, can be barrel finished now by using racking fixtures inside the barrel. This extends the range of use for this economical finishing method.

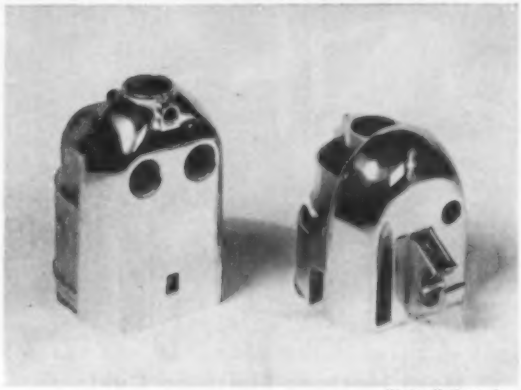

Photo: Enthone, Inc.

CHROMIUM PLATED ALUMINUM die castings open up a wide new potential of applications. This die cast motor housing for Dormeyer mixers is copper-nickel-chromium plated by Meisel Brothers, Chicago.

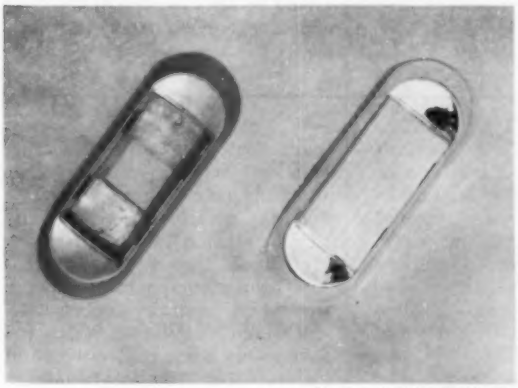

Photo: F. J. Stokes Machine Co.

VACUUM PLATING on zinc die castings is being studied for applications in the automotive and household appliance field. This bezel for an overhead car light has been vacuum metallized. The process reduces cost of polishing.

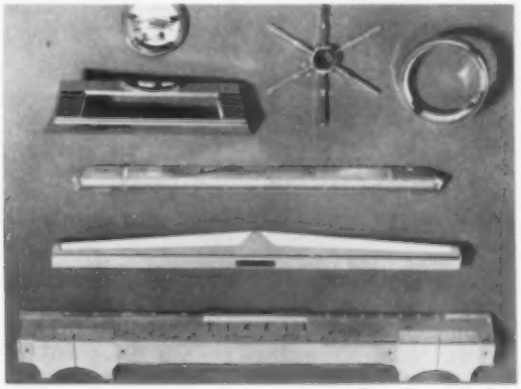

Photo: The Udylite Corp.

BRIGHT NICKEL is the protective intermediate layer between the copper and chromium plates. Use of bright nickel of new formulation reduces need for coloring. Nickel shortages increase the need for conservation of this metal.

PMM

DIE CASTING FORECAST ISSUE

FINISHES FOR DIE CASTINGS

They're Brighter, More Colorful, Less Expensive And More Durable

COLOR sells cars. Car builders agree that the sparkle of new color combinations on 1955 automobiles helped many Americans make up their minds that this was the year to buy ...

Chromium plate has long been recognized as the bright touch that livens many an otherwise uninteresting surface.

But the use of new finishes and decorative treatments has not been confined to the auto industry; practically every large-scale manufacturer has found that choice of finish can be a potent sales factor, whether he makes home appliances, business machines, scientific instruments, machine tools or hardware.

The finishing industry has come up with some new materials and techniques, many intended to improve appearance, some to promote durability, and others ... perhaps the majority ... intended to cut costs.

Thousands of tons of die castings this year were given some

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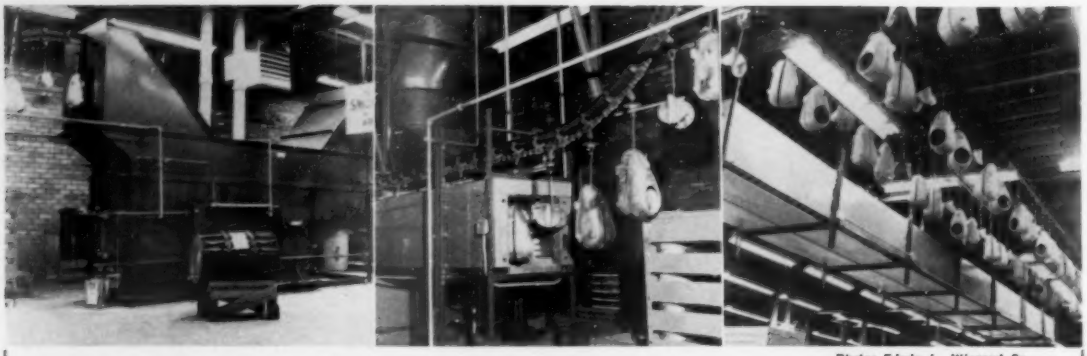


Photo: Edwin L. Wiegand Co.

Heat Hastens Finishing Cycle

Several places along the finishing line heat will hurry the operation. Here, automatically controlled electric heat helps to speed the wrinkle finishing of vacuum cleaner die castings. Chromalox elements 1) heat the degreaser; 2) preheat the work before painting; 3) heat the paint electrically; and 4) bake the finish.

Advantages reported include: 1) Time in second oven is cut from an estimated 20 minutes to 6 minutes; 2) Parts are heated evenly at equal rate by "color-blind" far-infra-red; 3) Manufacturing is continuous without need for storage; and 4) Entire operation is automatic, saving labor and eliminating guess work.

sort of finishing treatment, because die castings provide the exterior surfaces for countless consumer and commercial products. Some of the newer methods to gain widespread use on die castings, and some of the older methods that are finding increased acceptance now, are vacuum metallizing, direct chromium plate over zinc, water-reduced paints, gold plating, electrostatic paint spraying, conversion coatings, resin-bonded abrasives, combinations of paint and plating, barrel finishing of large castings, etc.

Vacuum Metallizing: One of the biggest cost factors in chromium plating is the preliminary polishing and buffing. Now, vacuum metallizing is coming into use on some types of products because the die cast surface is often good enough to use as cast: the heavy lacquer or enamel under-coat before the vacuum vaporized deposit of aluminum is usually enough to mask out minor blemishes without polishing.

New developments include protective organic coatings that promise extended service life. Even the auto builders are looking into this type of bright finish for die castings, both interior and exterior. Manufacturers of vacuum equipment say there is no reason why the life of an organically-coated metallized coating shouldn't hold up just as well as the body paint job on a car.

So far, principal users of vacuum metallizing for die cast trim are manufacturers of toys, novelties, fishing equipment, hardware items and decorative accessories.

Vacuum metallizing, which requires only a few millionths of an inch of aluminum coating, also offers possibilities of bright metallic colors, by dyeing the deposited coating or using a colored transparent lacquer over it.

Whether this type of coating will be able to compete with the brilliant, durable and wear-resistant chromium plating remains to be seen. It may be influenced by the shortage of nickel, needed to underplate chromium.

Chromium Plating: The shortage of nickel also has been responsible for the development of a method for applying chromium plating directly onto metal surfaces. This proprietary process offers a coating that is non-porous, with good adhesion.

Softer and more ductile than ordinary chromium plate, it is reported to have excellent adhesion and improved properties such as resistance to galling and seizing.

So far, the process is too new to be in full production in many places, but American Cabinet Hardware is using it on die cast

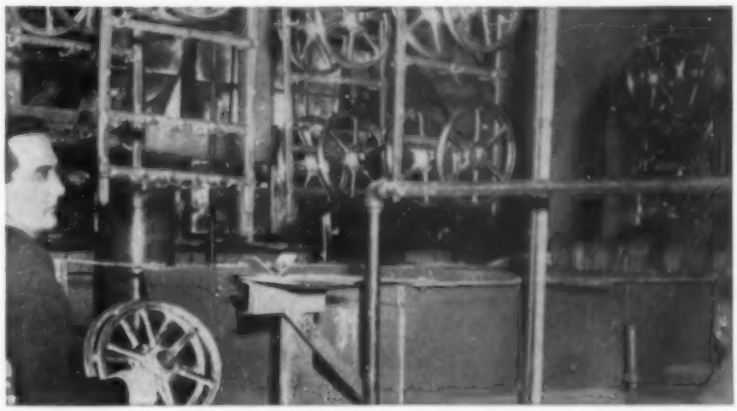
Continued on page 117

Photo: Universal Paint & Varnish Co.

WATER-REDUCED PAINT that is said to adhere tenaciously to untreated die cast surfaces is being studied for large scale application. Saves processing and eliminates fire and health hazard.

Chromating of zinc gives a desirable finish

Protection, economy and good quality achieved through use of Unichrome Dip



Economical, clear chromate finishing is being assured at the plant shown here because the chromate dip is matched both to the product and to the method of operation.

By chromate treating zinc, various finishes can be produced, including chromium-like clear, iridescent yellow, gold, brass, olive drab and black colors. There's more to these finishes than meets the eye.

There's greatly increased corrosion resistance for zinc plated steel or zinc die castings. There's also the ease with which the finishes are produced; the low cost per sq. ft. of area treated; the fine paint-base they form. In short, chromate finishing offers a quality finish and an economical one.

MATCH PROCESS TO PRODUCT

In operation, the chromate solution not only creates a corrosion resistant finish, but it also strips away some of the finish just formed. This chemical activity determines thickness of the chromate finish, and therefore its corrosion resistance. It governs color and eye appeal, as well.

Composition of the chromate solution, and time it acts on the zinc affect results. Even intricacies in shape of the product can affect uniformity of the finish.

RIGHT SOLUTION—RIGHT FINISH

The problem then is to get the one right chromate dip solution for the operation – the one that matches the needs of the product and the production setup and thereby assures satisfactory results and simple, trouble-free operation.

United Chromium is a good source to contact for chromate finishes. The unusually wide line of Unichrome Dips permits excellent matching to satisfy all the requirements – corrosion resistance, eye appeal, color, type of production equipment used, and specifications which must be met.

Write for specification chart giving details on Unichrome Dips for all chromating operations.

Plastisol coating makes ideal rack protection

Every practical requirement for a rack coating is fully satisfied by a unique plastisol material perfected by United Chromium. Unichrome Coating 218X delivers chemical and physical features that have enabled users everywhere to cut the cost of coating and maintaining racks.

WITHSTANDS ALL PLATING CYCLES

Coating 218X forms a heavy duty, resilient vinyl film free from pores or thin areas. One coat supplies all the protection needed for service in severest plating, anodizing and cleaning operations, including vapor degreasing cycles.

THE COATING FOR HARD USE

A flexible and remarkably tough coating, "218X" won't chip, tear, crack, scuff or blister. It maintains a sleek, smooth surface that sheds solutions readily, thereby reducing the contamination problem normally associated with drag-in of plating baths. Its adhesion is assured when applied over special Unichrome Primer 219PX.

Send for detailed information.

UNITED CHROMIUM DIVISION
METAL & THERMIT CORPORATION

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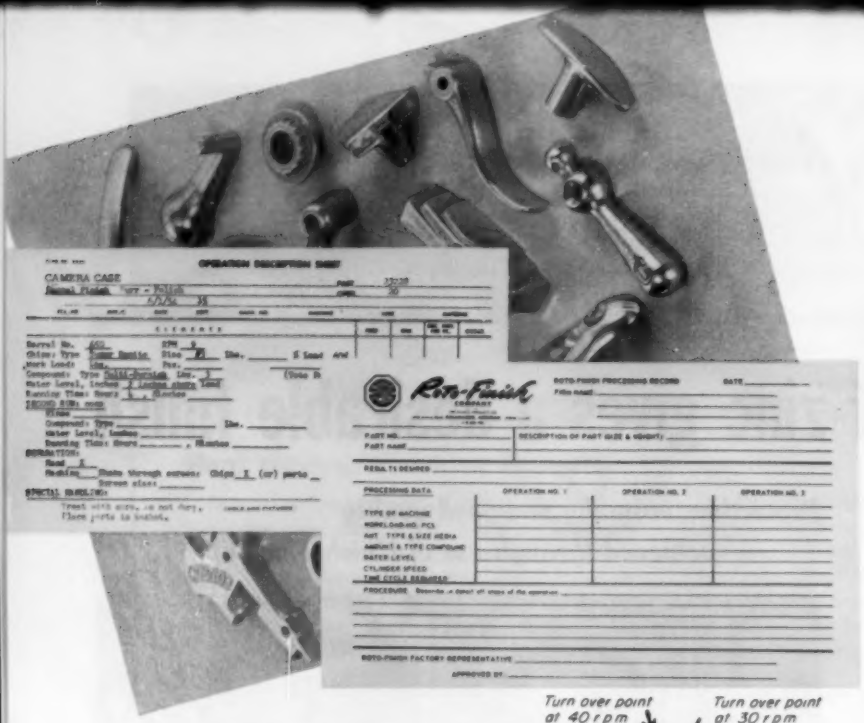
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada:
United Chromium Limited, Toronto 1, Ont.

For more information circle No. 108 on the Reader Service Card

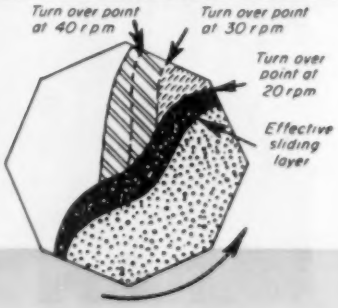
Precision



DETAILED RECORDS are the key to uniform finishes from batch-to-batch. When properly filled out, the card contains all specifications the operator needs to know to make future production runs on a given part. Two samples here are typical of those recommended.

"YOU can't generalize about barrel finishing," one old timer told us, "nor can you tell just by *looking* at a die cast part what barrel finishing cycle it ought to have. You must run tests, try different combinations of materials and times, until you find the one that does exactly what you want. Then write it down and follow that cycle for all subsequent batches of the same die casting."

Fortunately, most manufacturers of barrel finishing equipment and supplies have pilot setups to do this job. They will undertake trial runs to find the most effective combination of process factors to achieve the desired surface quality, thus saving the processor costly and time-con-



6 steps in making your trial run

The procedure for making a trial run will be of interest, since the operator of a barrel finishing department obviously cannot refer every job back to a manufacturer's pilot lab for recommendations. Here are the steps:

1. *Select the chips.* The shape and intricacies of the part, and the work to be performed, will dictate this choice. The size of the chip will be governed by the contours, recessed areas, quality of finish, and speed of cutting required. (The larger the chip, the faster the metal removal and the coarser the finish.)

For burnishing or coloring, a hardened steel ball or shape may be specified. Zinc diagonals, and even, non-metallics such as wood pegs may be used.

Chips are available in accurately graded sizes, and in addition to rate of cut and quality of finish, the chip should be chosen with regard for the size of holes and recesses. Chips should be selected that will not lodge in holes. Soft balls and shapes with proper abrasives, may be used also for cutting or deburring.

2. *Select the load height and barrel speed.* Recommendations on these points vary, but the range of load height lies between 50 and 75 percent full. Average level seems to be about 55 percent; less than 50 percent may result in "throw" which will damage parts, while more than 70 percent reduces the sliding action and lengthens the time cycle.

Average barrel speed is about 18–20 rpm with a 30 inch barrel. This has been suggested as a good starting speed for the trial run. As the diameter of the barrel decreases, speeds should increase, while the criterion for proper speed is one which keeps the work pieces moving in a compact, sliding mass. Too high a speed throws parts, while too low a speed does not provide enough sliding action.

Finishing In A Barrel

suming experimentation in his own plant.

Barrel finishing is basically a simple process with a limited number of variables to control, but slight variations in those factors can have important influence upon the finish obtained.

For that reason, specialists in the field agree that the commonest fault in barrel finishing practice is the failure of barrel operators to adhere precisely to the finishing cycle established for any given batch. To avoid this, they recommend a card file system, with all details recorded for each casting. In this manner consistent and dependable results are obtained from batch to batch.

The appeal of barrel finishing as a means of getting a specified surface finish on die castings and other high volume metal parts lies in the saving of skilled labor. Also, using relatively inexpensive capital equipment, many different grades and degrees of surface treatment can be accomplished. The same barrel can yield a coarse polishing action or a highly colored burnishing, it can remove burrs or prepare a casting for plating.

What Happens in a Barrel?

In the old days, tumbling was a more-or-less random action of abrasive stones, lubricant and water moving against the surfaces of the workpieces massed inside a rotating barrel.

Like other promising methods, tumbling was subjected to serious study and development, with the result that close controls were set up, more efficient equipment built, better abrasive media and compounds developed, and uniform finishes obtained. The term "barrel finishing" is now more commonly used to avoid the implication of haphazard or uncontrolled action.

When abrasive chips, compound, water and die castings, in proper proportions, are loaded into an octagonal barrel and rotated at the right speed, the mass moves up the side of the barrel until the effect of gravity causes the top layer to slide downward, accomplishing grinding or polishing.

Continued next page

3. ***Select the proper water level.*** Normal amount of water is approximately one to two inches over the top of the mass, especially for coloring or other bright finishing jobs, since more water tends to slow cutting action but refines the finish. For maximum cutting speed, the mass of chips may be merely wet, while low water levels (below the chip level) are often effective with abrasive compounds and acid cleaners for rapid scale removal. One company specializes in a dry barrel finishing process.

4. ***Adjust ratio of work to media.*** The proportion of work pieces to chips will be influenced by the finish to be achieved and the size of the work. Where finish is not too critical, it may be possible to use a ratio of one part work to one or two parts chips, but an average might be placed at one to three. Where very fine finish, close tolerances or recessed burrs are concerned, the ratio may climb to five or eight to one.

A quick load test suggested by one manufacturer consists of running a hand over the surface of the slide. If work pieces are being forced above the surface, an overload is indicated.

5. ***Select type and amount of compound.*** Such a variety of compounds is available that it is impossible to suggest the correct choice in general terms. One manufacturer, for example, lists 24 different compounds for various burnishing, grinding, cleaning, descaling or abrasive purposes; another reports close to 50.

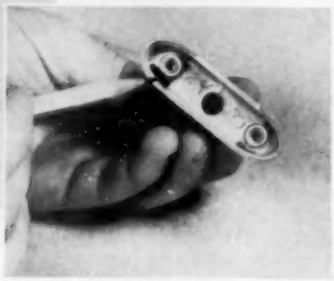
Specific compounds for finishing die cast parts have been developed. Abrasive compounds grind, deburr, radius and produce micro-inch finishes when high lustre is not important; lightly alkaline grinding compounds may be used for these same jobs where subsequent burnishing is done; special, highly alkaline burnishing compounds impart a high lustre to zinc or magnesium die castings; special compounds for aluminum are also available.

Ratio of compound is set by one company at five to eight ounces per cwt of parts or chips (depending upon the operation) and two to four ounces per cwt of chips for finishing or cleaning. Specific ratios must be obtained from the compound manufacturer.

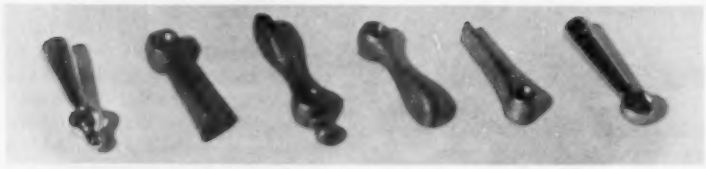
6. ***Set the time cycle.*** This is reported to be the most difficult prediction to make: How long will this job run? Checking over the time cycles of dozens of production jobs, the conclusion is that most jobs run from a half hour to two hours. Deburring or burnishing usually takes less than two hours, but for heavier action, such as grinding or radiusing, work may run for four or five hours. In some cases, cycles run up to 15 or 16 hours.

About Shapes And Sizes . . .

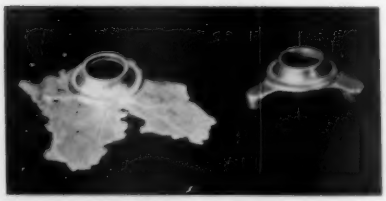
CHIPS MUST BE LARGER than any recesses in the casting to avoid lodging in the holes. (Minnesota Mining & Mfg. Co.)



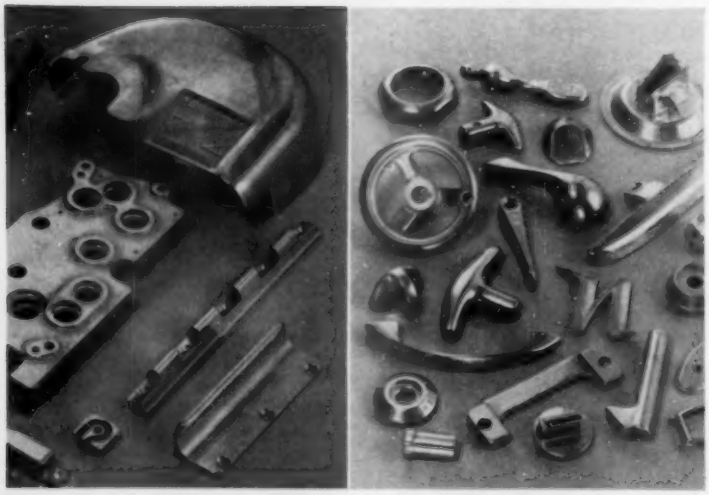
AN IDEAL SHAPE for barrel finishing is a gradual or gently rounded curve.



SIMILAR BUT DIFFERENT: The five water faucet handles are not all the same when it comes to barrel finishing. The second and fifth handles from the left are more difficult to process to a high finish, free from impingement. (Roto Finish Co.)



THIN, PERIPHERAL FLASH can be cleaned from a simple shape as part of the complete barrel finishing cycle. (Norton Co.)



ALUMINUM OR ZINC die castings are equally easy to finish in a barrel. Techniques and materials are available, regardless of size. Here are some representative castings: aluminum (left) and zinc (right). (Roto Finish Co.)

Burnishing, a kind of rubbing action is accomplished with steel balls, shapes or other nonabrasive materials.

About 90 percent of the grinding, polishing or burnishing action takes place during this slide; very little work is done while the parts are moving up the side of the barrel. It is reported that a standard barrel with 30-inch ID, operating at 20 rpm, has a layer of sliding material approximately three inches thick. Material in this layer and immediately beneath it is subject to finishing action.

Choice of media, compound, number of revolutions per minute, length of process cycle, amount of water, and weight of workpieces, as well as the choice of diameter, length and type of barrel will have important bearing on the quality of surface obtained.

What Can Be Finished?

The majority of die cast parts, regardless of alloy, are suitable for barrel finishing, either as an end-finish or as a preparation for some other finishing operation such as painting, plating, anodizing, metallizing, etc.

At one time, this process was limited to small, rounded pieces with weight evenly distributed throughout, but newer methods, equipment and materials have extended the range. Now, extra large pieces, complex shapes, pieces with heavy sections, are as readily finished in barrels as are the small, uniformly shaped pieces.

This is not to imply that *all* parts can be barrel finished, nor that some configurations are not easier than others, but most die castings are adaptable to it.

The "ideal" workpiece for barrel finishing is generally considered to be a gently rounded, uniformly curved piece without deep recesses to trap chips. The most difficult would be a dead flat surface or one requiring retention of sharp corners. But the illustrations presented here demonstrate that there is very little actual limit on shapes of die castings that are being successfully barrel finished.

Large parts, or those having one section much heavier than the rest of the casting, may require racking inside the barrel so that

all surfaces are presented equally to the finishing action, but the majority of die castings are processed loose.

Questions concerning the adaptability of any specific part to barrel finishing can only be answered individually. There is no general guide or rule-of-thumb for determining this in advance.

If the die casting (or any other type of part) can be designed with the finishing method in mind, it is often possible to simplify the finishing cycle, to avoid pitfalls that mean extra finishing problems, or to improve the quality of finish obtained.

What Types of Finish?

One of the greatest advantages of barrel finishing is the enormous range of finishes that can be given to a variety of shapes. While this is not generally a process for heavy metal removal, it can be used sometimes for work comparable to grinding or polishing. Removal of burrs and fins is another type of operation that calls for metal cutting action.

Action comparable to buffing, coloring or burnishing is likewise accomplished in a barrel by surface working or cold flowing rather than cutting.

The surface skin on die cast parts should be preserved, as far as possible, and for this reason, some processors recommend removing all parting line flash with an abrasive belt prior to barrel finishing. Thus, the parts are not subjected to a prolonged, over-all cutting action that would be necessary if the heavy, excess metal were to be removed in the barrel.

Some of the uses for barrel finishing include:

1. *Deburring* — removing machined burrs, ejector flash, etc.

2. *Grinding* — removing of parting line flash, blending of contours, removing flash roots.

3. *Improving Surface Finish* — reducing micro-inch finish, for example, from 150 to 20-25 or from 300 to 100 micro-inch.

4. *Radiusing* — controlling uniformity of radii. Often a radius from .001 to .040 can be obtained.

5. *Coloring and burnishing* — bringing out a high lustre to serve as a marketable finish, especially on aluminum die castings.

6. *Preparation for plating* — imparting a degree of smoothness and brightness to serve as the starting point for chromium plating, especially on zinc die castings.

One manufacturer suggests four classes of finish that can be obtained on die castings with barrel finishing methods. These are:

1. *Mirror finish* (brilliantly reflective, mechanically smooth) Easily obtainable on smaller, decorative type items having rounded or convex surfaces; less practical for large, flat surfaces; difficult on concave or deeply recessed surfaces.

2. *Production finish* (bright, mechanically smooth) Most plating processes will develop a colorful, bright plate over this surface. Barrel finishing can be applied to a wide range of parts for which a production finish is satisfactory, including large, flat or concave surfaces.

3. *Commercial finish* (mechanically smooth, clean) Barrel finishing compounds recently developed will produce this finish in a single, short cycle, leaving a surface that will produce a bright plate by most plating processes. In the case of small, convex areas, results often compare with former, more expensive methods used to secure mirror finish.

4. *Satin or matte finishes* (mechanically smooth, clean, dull) Easily developed, applicable to any part that can be barrel finished.

What Will it Save?

Actual dollar and cents comparisons are difficult to obtain, but savings of 50 to 80 percent are common as compared to older, manual finishing operations. Reasons are not difficult to recognize.

A large camera manufacturer, for example, has reported that the cost of preparing die cast aluminum camera cases has been reduced from $0.118 to $0.059 while rejects due to surface defects dropped from 54 percent to less than seven percent by introduc-

Continued on page 92

Keep these points in mind when setting up your barrel department

Here are good and bad practices:

DO

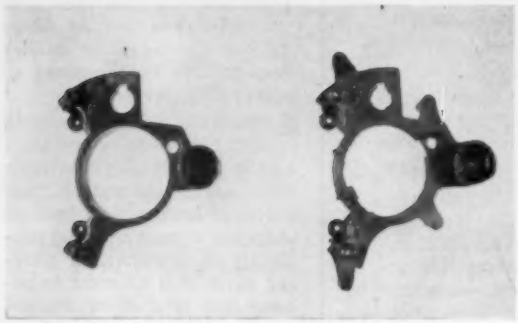
1. Select chip size that will not lodge in recesses. Chips must also be larger or smaller than part to be processed so parts can be screened.
2. Separate chips regularly and replace in proper storage bins. Remove broken chips and foreign material. Removal of broken steel balls or shapes is a must to avoid possibility of scratching or gouging parts. It is an error to believe that rejected or cracked bearing balls can be used.
3. Keep barrel finishing area as clean as possible. Have floors pitched slightly for drainage.
4. Handle parts carefully in loading and unloading, as well as during separation.
5. Follow exact process cycle specifications to assure uniformity.
6. Provide adequate loading, unloading and screening facilities.
7. For best results, degrease castings before processing.
8. When burnishing, extreme care must be taken to see that all grease, scale and dirt is removed before the parts are placed in the barrel. Otherwise, the contaminant will literally be rolled into the surface of the parts being finished.

DON'T

1. Expect barrel finishing to be a "cure-all" or salvage operation for casting defects.
2. Expect barrel finishing to be effective unless you have competent supervision.
3. Expect quality work unless every detail of the process has been carefully planned.
4. Process too many parts with too little media or too small an amount of compound.
5. Try to economize by "getting by" with cheaper or poorer chemical compounds or media without regard for the work to be done.
6. Overload equipment.

Barrel Finished In Production

The range of finishes and variations in operating cycles are indicated from the several case studies presented here. All are actual production jobs.

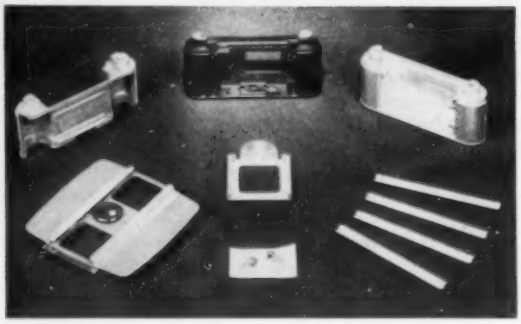


CASE NO. 1

Excessive flash has to be removed while maintaining uniform radii; color is to be improved if possible. About 90% saving over hand finish methods is made by using a 30" diam. x 32" long barrel with the following procedure:

Grinding—About 1200 parts are processed with #3½ Almco bonded chips and #3 grinding compound. Load height is between 50 and 55%, with water level 5" below the top of the mass. Barrel speed is 20 to 22 rpm and time cycle is about 4 hr.

Burnishing—Replacing the grinding compound with #14 Almco burnishing compound, parts are then rotated another 45 min. at 12-15 rpm. Load height is 50 to 55% and water level is 5" below the top of the mass.

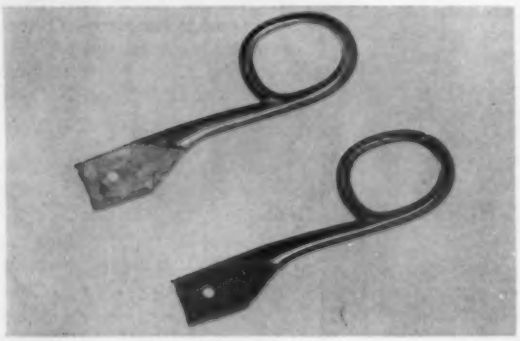


CASE NO. 2

Preparation for painting of die cast aluminum camera case calls for a barrel burnishing cycle, while die cast zinc shutter cocking levers for the same camera are barrel finished prior to plating.

Camera body—Parts are processed 200 per work load in a 45" two-compartment barrel carrying a 60% load of Super Honite #3 chips and three pounds of a burnishing compound and water 2" above the load. Barrel speed is 9 rpm and time cycle is 4 hr., after which the parts are hand-separated from the chips.

Cocking levers—Parts are processed 8,000 pieces per load with synthetic chips and Honite Clean Cut surface cutting compound. Water level is even with the load, barrel speed is 35 rpm, and the load rotates for 18 hours.

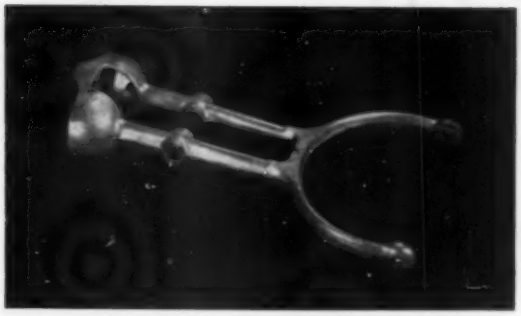


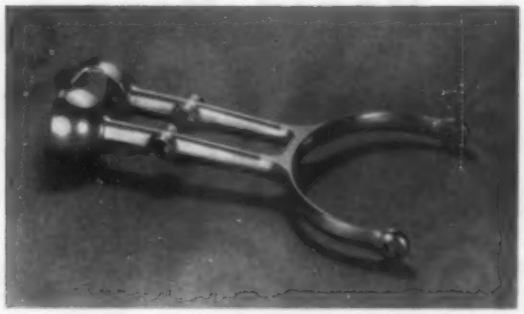
CASE NO. 3

Shear handles, die cast in zinc alloy, are barrel burnished at a rate of 3,000 per work load in a 30" x 32" barrel, loaded about 60 percent full with 500 pounds of Super Honite #4 synthetic chips. Barrel speed is 20 rpm with a one hour processing time cycle. To the chips and work are added 1½ pounds of burnishing compound and enough water to fill the barrel halfway.

CASE NO. 4

Pre-plating finish of this plumbing hardware includes the production of a high lustre, as well as removal of parting lines. Two operations are used, with about 2,000 pieces per load. A standard 30" diam. x 32" barrel was filled 60% full. Using #4 Almco bonded chips throughout, the first operation called for a #2 compound for 5 hours at 20 rpm, followed by 1 hour at 12 rpm with #1 compound. Savings were 90% over hand finishing methods.



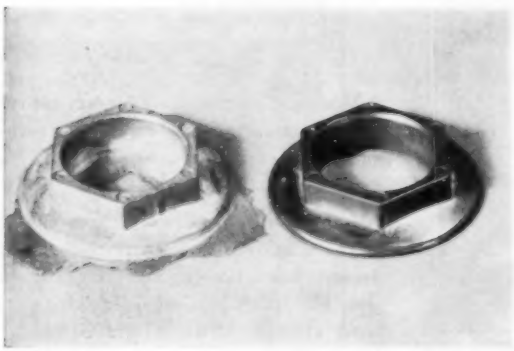


CASE NO. 5

Two methods have been worked out to prepare this egg beater frame for plating. Since good smoothness, color and lustre are needed, materials have been selected for this action.

First Method: Parts are run at 12 rpm in a 30 x 32" 2-compartment barrel, each compartment having 6½ cubic ft capacity. Chip used is Lorco 2 and 4 with total load of 70 percent drum capacity, 5 gal. of water, 3 lbs. of Lorco 4X and 6 ozs. of Lorco ZA for a cutting cycle of 1½ hrs. The load is then rinsed and water added to cover the mass. Then 1½ lbs. of the ZA is added for a 45-minute burnishing run.

Simplified method: Equal results are now obtained getting smooth cut and fine color in one operation. In the same compartment, at 12 rpm, parts are loaded with Lorco 2 and 4 chip to 70 percent capacity and run with 2 lbs. of ZA and 6 gal. of water for 2¼ hours.



CASE NO. 6

Flash removal and deburring are accomplished on the zinc die casting, giving a bright finish.

Roughing: Barrel used for roughing and finishing is a horizontal, octagonal type, lined, with 30 x 28" compartment. For roughing, Alundum tumbling abrasive size 50-T is used, 800 lbs. per compartment. Water level is 3" below level of charge, and ½ lb. of cleaner is added. Barrel runs for 5 hrs. at 25 rpm.

Finishing: Using 800 lbs of Alundum 38-T, and with water level about 10" above level of the charge, the barrel is run for ¼ hr. at 15 rpm. Two lbs. of suitable cleaner is added to the barrel.

CASE NO. 7

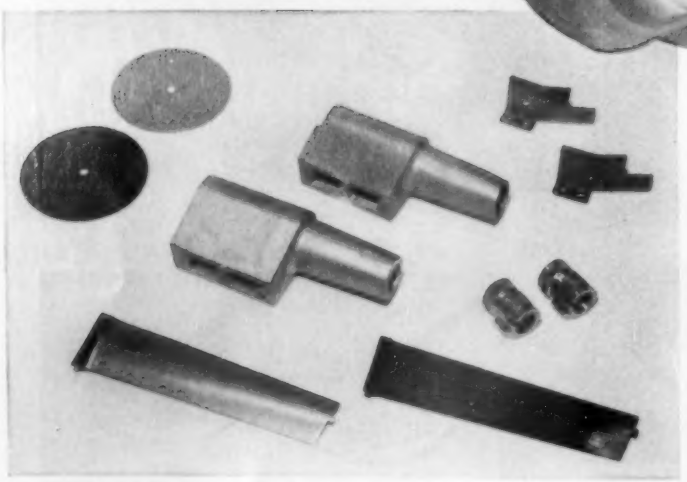
Thousands of small knobs can be prepared for plating at one time.

Top: In a 2-compartment 36 x 45" barrel, 5,000 of these die cast zinc knobs are cut and colored in one operation. Finisher uses 700 lbs. of Honite chips size 3½ with 3 lbs. of Multi-Burnish compound. Running time is 2½ hrs., followed by drying in ground corn cobs.

Bottom: In a 40 x 48" 2-compartment barrel, 6,000 of these die cast knobs are processed with 800 lbs. of limestone chips. For cutting, 8 lbs. of Clean Cut compound are added. Parts run 3 hrs. with low water level. For coloring, parts and stones are rinsed, then run 1½ hrs. using 3 lbs. of burnishing compound.

For Rapid Barrel Finishing

EXOLON Tumbling Abrasive



Various stamped, die cast, forged and screw machine parts before and after barrel finishing with EXOLON abrasives.

• More and more manufacturers are turning to barrel finishing for its big savings and uniformity over individual hand finishing.

Naturally, the process is only as effective as the abrasive used. In response to the demand for a fast-cutting, long-life abrasive, EXOLON has developed this superhard aluminum oxide grain which is *barrel-finished itself* for non-scratch, precision smoothing of your metal surfaces.

May we barrel-finish some of your sample parts *at no obligation to you?* Or, if you prefer, we are prepared to furnish you trial lots of Exolon Barrel Finishing Abrasive at quantity discount for trial in your own barrel. You will find, as others are finding daily, that it gives you a superior finish at substantially lower cost. Write today!

SINGLE OPERATION ECONOMY

★ IN CLEANING UP
★ IN REMOVING BURRS
★ IN REMOVING SCALE

from:

- forgings
- metal castings
- metal stampings
- machined parts

which can be handled in the barrel.

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Manufacturers of SILICON CARBIDE *and* ALUMINUM OXIDE ABRASIVES

For more information circle No. 94 on the Reader Service Card

ALMCO AWARD GIVEN FOR DEBURRING JET DISCS; NEW CONTEST

Winner of the first Supersheen award for the largest total dollar savings with Almco barrel finishing equipment is the Le Roy Machine Company, Le Roy, N.Y.

Savings reported by Le Roy amount to over $124,000 annually over previous deburring methods. This was accomplished by the installation of one Supersheen fixture barrel, used for deburring compressor rotor discs for jet aircraft.

Not only does the barrel finishing meet rigid Air Force specifications on the break-edges, but deburring time has been cut from 18 hours to four hours per disc, increasing production 450%.

As winner of the quarterly $100 award, Le Roy is eligible for the $250 annual prize which is awarded to the company making the greatest total dollar saving over the 12 month period. Almco's new contest starts Sept. 11 and ends Dec. 31. Entry blanks can be obtained by writing Almco, Albert Lea, Minn.

Get Barrel Finishing Prize

Looking with interest at the SUPERSHEEN Award for greatest total dollar savings with Almco barrel finishing equipment are, left to right: A. F. Grayson, president; R. O. Braaten, project engineer; and John Byrne, draftsman, all of the Le Roy Machine Co.

FINISHING FIRM OCCUPIES NEW FACTORY

Lea-Michigan, Inc., 14066 Stansbury Ave., Detroit, Michigan, one of four companies comprising the Lea Group of finishing specialists, is now occupying a new factory where it is manufacturing a number of Lea products used in connection with plating, polishing and buffing.

need a finish for low cost corrosion protection or showroom sparkle?

specify IRIDITE®

Whether you're finishing non-ferrous parts for high corrosion protection, paint base, or for showroom sales appeal, you can be sure of low material and production costs and peak performance when you specify Iridite. Here's what you can do with Iridite:

- **ON ZINC AND CADMIUM** you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.
- **ON COPPER . . .** Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.
- **ON ALUMINUM** Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.
- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

Iridite is approved under government specifications

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Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals.
WEST COAST LICENSEE: L. H. Butcher Co.

For more information circle No. 92 on the Reader Service Card

USEFUL LITERATURE CATALOGS, MANUALS

to get any of the free materials described here, circle the appropriate number on the reader service cards bound into this issue

PROCESSES

Investment Casting Process, Alloys, Design: 154
Bulletin No. 1 of the Investment Casters Society has just been released for general distribution. This highly informative bulletin gives considerable design information, a listing of castable alloys (both ferrous and nonferrous) with their as cast physical and mechanical properties.

MATERIALS & EQUIPMENT

Indicating Pyrometers: 158
A new bulletin, F 6048-1 has recently been issued that describes a line of indicating pyrometers made by the Wheelco Instruments Co. Instruments with ranges up to 3600F are described and illustrated. Two models of the line of instruments are covered in the bulletin as well as a combination indicating pyrometer and multi-position switch.

New Die Casting Machines: 52
Advance information on an all-new line of die casting machines in the range of locking pressures from 250 to 850 tons will be supplied as soon as available by the Lake Erie Engineering Co.

Melting Furnaces: 160
The complete line of standard furnaces for melting nonferrous metals is described in bulletins that are available from The Campbell-Hausfeld Co. Both stationary and tilting types are covered, gas and oil fired.

Heat Treating Furnaces: 161
Hints on heat treating tool steel is the subject of a highly informative report that has been published by K. H. Huppert Co. In addition, the report contains some general information on the use and care of electric heat treating furnaces.

Vacuum Melting Metal: 162
An eight-page bulletin on the vacuum melting of metals as practiced at Utica Drop Forge & Tool Corp., metals div. has been prepared. This booklet should be of interest to all concerned with product design or metallurgy.

Differential Expansion Thermostat: 163
A standard model of differential expansion thermostat for use in the range of 35 to 600F is described in a brochure that has been prepared by the Burling Instrument Co. Prices, sizes and capacities are all given.

Swiss Die Casting Machine: 164
A new 600 ton die casting machine that utilizes what is described as a three phase injection system is described in a bulletin that has been issued by Buhler Bros.

Temperature Control Crayons: 165
The application of Tempil crayons for indicating temperatures in the plastics molding field is given in a paper that has been reprinted by the Tempil Corp. Both injection molding and shell molding applications are covered.

Titanium News and Applications: 166
The Rem-Cru Titanium Review, a publication of Rem-Cru Titanium, Inc. gives news about titanium, how to fabricate it and where it is being used. The most recent issue, July 1955, contains material of interest on both government and civilian applications.

Impregnating Equipment: 167
A new bulletin has been issued by Prenco Products, Inc. which describes the controlled temperature reservoir and pump units used in casting impregnation. A new metal oxide sealant for closing micro-porosity is also described.

Foundry Service Bulletin: 168
An information service bulletin designed to give foundrymen and designers basic information to help produce better, sounder castings is issued regularly by Foundry Services, Inc. Bulletin No. 3 is currently available.

Thermocouple Tubes: 169
Claud S. Gordon Co. has issued a new four-page bulletin on their Serv-Rite standard thermocouple protecting tubes and protecting wells.

Tool Steels: 170
A new 44-page book entitled "Tool Steels for the Non-Metallurgist" has been prepared by the Crucible Steel Co. of America. The book aims to present the basic information needed to understand tool steels without being overly technical.

FINISHING

Lead Screw Tapper: 172
How to produce "gauge perfect" tapping without any part spoilage, stripped threads or thread distortion is indicated in a new, illustrated brochure from Procunier Safety Chuck Co. about its new lead screw tapper. New operating principle features "finger tip"' control to eliminate operator fatigue.

Plating Rectifiers: 173
A 12-page illustrated catalog entitled "A Guide to Better Plating Power" has been published by the Bart-Messing Corp. The catalog covers the company's complete line of selenium rectifiers.

Aluminum Surface Coating: 174
A new product which forms a chromate coating on aluminum is described in literature that is available from the Chemical Corp. The new surface protective material is said to replace anodizing where hardness is not a problem and will withstand 600 hours salt spray test. It can be dyed many different pastel colors.

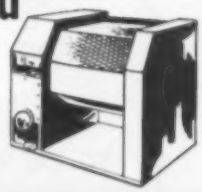
Aluminum Oxide Stripper: 175
A new non-chromic acid stripper for removing all types of anodic coatings from aluminum parts and racks has been announced. The new material is alkaline in nature and contains no ingredients which make waste disposal a problem. Complete literature is available from Enthone, Inc.

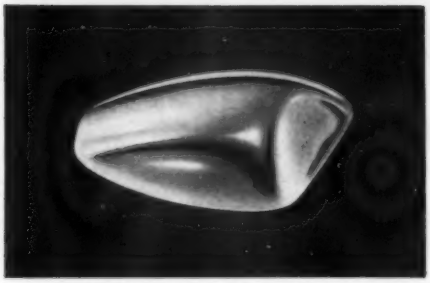
Plating Plant Corrosion: 176
Corrosion in the plating plant is an ever present problem. According to new literature just released it can be prevented or minimized. United Chromium Div. of Metal & Thermit Corp. has a four page brochure available that describes a line of corrosion inhibiting materials.

Rhodium Plating: 177
The Bright Rhodium Process is the subject of a new brochure that has been issued by Sel Rex Precious Metals, Inc. The brochure described a plating process for rhodium that gives a bright plate at modest cost.

PRODUCT OF **3M** RESEARCH

New HONITE "Micro Cut" Compound gives super smooth finishes on zinc and aluminum die castings!





Use HONITE "Micro Cut" Compound for Mirror Finish on Stainless Steel

On stainless, new "Micro Cut" Compound mirror finishes without darkening, preserving the metal's bright natural color. Impingement control prevents scratches and nicks—corner break is generated with NO dimension change.

Yes, now you can put a super smooth finish on zinc or aluminum die castings. New HONITE Brand "Micro Cut" Compound contains a brand-new, superfine, natural abrasive (exclusive with HONITE) which assures a smooth finish on every die casting. And HONITE "Micro Cut" Compound can cut the "extra steps" from your barrel finishing operation, too. You can eliminate extra rinsing . . . extra coloring . . . extra labor!

HERE'S HOW! On zinc or aluminum die castings, HONITE "Micro Cut" Compound gently and quickly polishes out surface imperfections without "skinning" or exposing porosity—*and* reduces impingement or nicking, because it holds the parts firmly in the chip mass during the run. You get a quality surface for quality plating on zinc die castings . . . a super smooth surface on aluminum die castings . . . with no need for extra rinsing or coloring!

Write today for a demonstration in your plant of HONITE "Micro Cut" Compound.

Honite BRAND

MINNESOTA MINING & MFG. CO.
DEPT. FF-95, ST. PAUL 6, MINN.

☐ Yes, I'd like a demonstration of HONITE "Micro Cut" Compound.

☐ Send me free copy of booklet: "Facts and Figures Report on HONITE Barrel Finishing", which contains complete information about HONITE barrel finishing compounds.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "SCOTCH" Brand Pressure-Sensitive Tapes, "SCOTCH" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

For more information circle No. 100 on the Reader Service Card

DO YOU NEED ANSWERS TO THESE QUESTIONS?

1 How can I electroclean steel at lower cost?

2 How can I find a brass cleaner that gives better protection against tarnishing?

3 How can I reduce rejects due to faulty electrocleaning of zinc die castings?

Answer 1 Following an Oakite recommendation, one plater made a small change in his steel-cleaning cycle and soon had two tankfuls of cleaning solution doing the work of three—and the plate adhesion was improved. *See booklet offered below.*

Answer 2 Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current. *See booklet offered below.*

Answer 3 Oakite has an anodic conditioner that offers brighter plating of zinc die castings . . . with no anodic blackening and fewer rejects. *See booklet offered below.*

FREE For more information about the electrocleaning of steel, brass or zinc die castings, send for one or all of the booklets listed in the coupon.

four good steps toward better electroplating on steel
NEW
Good news about electrocleaning zinc-base die castings
OAKITE

Technical Service Representatives in Principal Cities of U.S. and Canada

OAKITE PRODUCTS, INC.
340 Rector Street, New York 6, N. Y.

Send me the free booklets I have checked below:

☐ "Four good steps toward better electroplating on steel"
☐ "What's NEW for electrocleaning brass and other copper alloys"
☐ "Good news about electrocleaning zinc-base die castings"

Name.....

Company.....

Address.....

For more information circle No. 102 on the Reader Service Card

USEFUL LITERATURE

Continued from page 78

Specialty Steel Guide: **179**
A new 32 page illustrated guide to specialty steels is now available to all steel users. Issued by The Carpenter Steel Co. the booklet defines the distinctive characteristics of a broad range of special purpose steels in terms of end use.

Production Metallurgy Notes: **180**
A new publication, "The Alloy Specialist" has been brought out by the Cannon-Muskegon Corp. containing practical notes and tips on production metallurgy. The current issue No. 51 is a nine page one aimed specifically at the investment foundry.

Literature Check List: **181**
A checklist covering some 15 different publications, with an abstract of each, has been prepared by Diamond Alkali Co. to aid interested people in selecting the reference manual or hand book most appropriate for their needs.

Temperature Control: **182**
Temperature indication, control, permanent record, timer control for ventilation and temperature limit control, plus completely automatic time-temperature program control for a full heating and cooling cycle are all built into the control center that uses Wheelco instruments for nerve centers. Full information about controllers and control centers is available from the Wheelco Instruments Div. of Barber-Colman Co.

NOW the NEW IMPROVED

GALVAPREP

BETTER THAN EVER

for Superior Paint Adhesion on ZINC DIE CASTINGS and other ZINC COATINGS

• It acts quicker . . . affords more coating and better and more durable paint adhesion . . . You will immediately notice the difference in the NEW IMPROVED GALVAPREP, its superior performance, its greater effectiveness. *Ask for Bulletin 50-89*

Use **LYFANITE-A** a Phosphate Coating for Treating **ALUMINUM DIE CAST SURFACES** and other Aluminum alloys before painting *Ask for Bulletin 55-133*

Made by the Manufacturers of Metalprep and other Prep Products

NEILSON CHEMICAL CO.

Southeastern Distributor: P. M. KELLY CO. Charlotte, North Carolina
6563 Benson St., Detroit 7, Mich.
Los Angeles 22, California Windsor, Ontario

For more information circle No. 101 on the Reader Service Card

New Alloy Series: 183

A new series of hardenable corrosion resistant steels has been introduced by Cooper Alloy Corp. The alloys are all of the 19% Chromium, 9% Nickel type with varying amounts of molybdenum, copper and silicon. Carbon and manganese are both controlled at low levels. Complete data on these alloys is available.

New Electric Element: 184

By corrugating a sheet of nickel-chromium resistance alloy and then applying a surface coating of vitreous enamel, engineers at Lindberg Engineering Co. have developed a panel heating element that works equally well in air, controlled atmospheres, or carburizing atmospheres. Complete details of the new elements can be secured from the company.

Metals and Alloys: 185

A new booklet on metals and ferro-alloys made by the company has been prepared by the Shieldaloy Corp. The booklet features a listing of applicable products to fit specific industrial needs.

Automatic Pouring Unit: 186

Two pamphlets have been issued by Ajax Engineering Co. on two new melting furnaces. One of these is a combined induction melting furnace, holding pot and automatic pouring unit that is particularly suitable for fully automatic die casting operations.

Metal Plating Chemicals: 187

The Baker & Adamson Div. of Allied Chemical & Dye Corp. has prepared a brochure on their metal fluoborates for use in electroplating. Complete details of the materials, their advantages and uses are given.

Automatic Plater: 188

A fully automatic plating mechanism, the Platocrat, is completely described and illustrated in technical material available from Wagner Brothers, Inc.

Get the full story of the newest MOST ADVANCED TAPPING UNIT EVER DEVELOPED

Illustrated brochure reveals the exciting story of a remarkable new Lead Screw Tapper. Tells how you can now tap with an ease and precision that's unparalleled in tapping history! Graphically shows how each part produced by this lead screw unit is "gauge perfect" — always! There is no variation—ever! You eliminate part spoilage, stripped threads, thread distortion. With the exclusive finger tip control you eliminate operator fatigue, too. Designed on a new operating principle it has many outstanding features: Trigger arm travels only ⅝"; depth held within .005"; depth stop automatically disengages clutch at bottom of stroke; friction clutch prevents tap breakage; hardened and ground lead screw replaces in seconds for pitch changes; unique wiper oils and cleans lead screw while in operation; plus many other features.

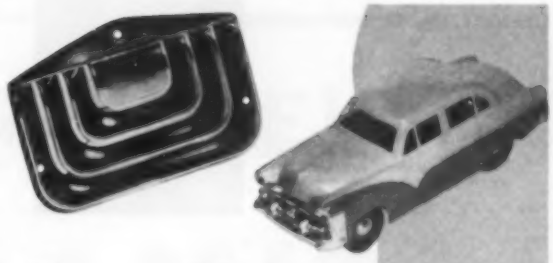
Write for your free copy today—now!

Procunier Safety Chuck Co.

14-16 S. CLINTON ST. • CHICAGO 6, ILL.
DEPT. 9

lighter, smaller, permits easier tapping close to walls and shoulders.

For more information circle No. 104 on the Reader Service Card



FIORE MASKS FOR PRECISION PAINTING

Spray decorating methods have improved so rapidly in recent years that you may not be aware of some time-saving, money-saving techniques now available. Today, special Fiore designed spray masks and fixture devices make possible single or multi-color decoration with precise registration on irregularly contoured products.

IF { your product is judged on appearance
you want best possible results
you want a minimum of rejections

CONSULT US

Send for your FREE copy of our 20-page book which shows the different types of masks and gives case-study illustrations of their use. Or send your samples and drawings for consultation and estimates.

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to get any of the free materials described here, circle the appropriate number on the reader service cards bound into this issue

PRODUCT NEWS AND DEVELOPMENTS

SINGLE HIGH-VACUUM PUMP MOVES 12½ LBS. OF AIR PER HOUR

Removing 12½ pounds of air per hour (one million micron-liters per second) from a semi-continuous melting and casting furnace — with a single high vacuum pump — is now possible with the new diffusion ejector pump just announced.

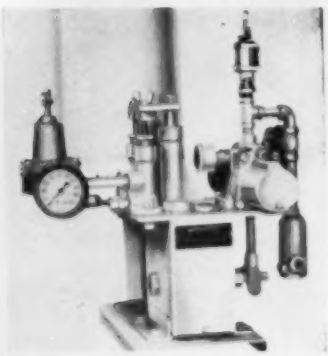
Designated as the type KS-1600 Diffusion-Ejector Pump, the new unit is the largest three-stage oil ejector pump ever built.

The new pump removes air at a speed of 18,000 liters per second and pumps hydrogen at a speed of 42,000 liters per second. Its wide performance range, from one-half to two-hundred microns pressure, permits diversified application in the chemical, petroleum and metallurgical industries.

The pump will handle the gas load of a 1000 pound high-vacuum melting and casting furnace. The 5000 and 10,000 pound vacuum melting furnaces now under consideration will be evacuated with this pump.

Consolidated Vacuum Corp.
For more information, circle No. 207 on the Reader Service Card

ABRASIVE BELT LUBRICANT APPLIED AUTOMATICALLY



An automatic lubricator for abrasive grinding belts has just been announced. The new unit is said to be compact and offers more accurate control than other spray devices previously available for increasing the life of grinding belts.

The standard unit consists of an adjustable stroke pump driven by a reciprocating air motor and incorporating a spray control cylinder that triggers the air only when the fluid is being delivered to the spray nozzle.

Controls are provided to regulate accurately the frequency of application, the amount of lubricant pumped per stroke, and the pressure at the nozzle. The standard unit is recommended for belts up to 8" wide. For wider belts additional units can be added.

Experience with the spray lubricators has shown that abrasive belt life is increased from two to three times over non-lubricated belts.

Munsel
For more information, circle No. 205 on the Reader Service Card

TUMBLING MEDIA IN NEW SHAPES AND SIZES

Ceramic tumbling barrel media, produced in triangular shapes was recently announced. Now the company who first brought out the material has announced the availability of this triangular shaped finishing material in much smaller sizes than have been made in the past.

The new small-sized media considerably extends the range of usefulness to which it may be applied. Using the new material, fine finishing work is said to be more easily accomplished.

The addition of this smaller size makes available a complete range of sizes for many different deburring and finishing applications. By selecting the proper size, the "lodgement" hazard, encountered when conventional random-shaped natural or synthetic stone chips lodge in holes and slots, is eliminated.

Crown Rheostat & Supply Co.
For more information, circle No. 206 on the Reader Service Card

FREE SAMPLE!

BURNAMITE*

*Trade Mark

***The Revolutionary* NEW**

BURNISHING & TUMBLING FORMULA

Specially developed to produce

the COLOR, LUSTRE and FINISH *YOU WANT* on

• ZINC DIE CASTINGS

. BRASS . COPPER . STEEL . WHITE METAL

. SOFT SOLDERS • ALUMINUM . ALUMINUM DIE CASTINGS

Works in All Hard Water Areas

BURNAMITE the Superior Homogeneous Burnishing Formula in powder form . . . developed after 3 years of intensive research. Now available in ample quantities for prompt delivery!

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RUTLEY *industries, inc.*

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Please send FREE BURNAMITE Sample to:

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ADDRESS:

CITY: ZONE: STATE:

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For structural and other parts produced by POWDER METALLURGY

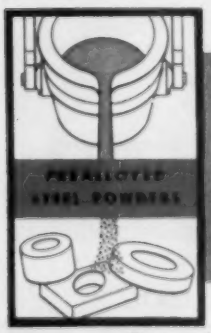
VASCO
Prealloyed
STEEL POWDERS

Featuring Powders for Parts Requiring:

√ HIGH STRENGTH
√ DUCTILITY
√ HARDNESS
√ WEAR RESISTANCE
√ CORROSION RESISTANCE
√ RESPONSE TO HEAT TREATMENT
√ POROSITY OR FULL DENSITY
OR A COMBINATION OF THESE PROPERTIES

These powders are produced direct from the molten metal, each particle being of the chemical analysis of the full melt. The analysis, of course, can be varied to create emphasis on any of the above mentioned properties.

Typical compositions are A.I.S.I. 4650 for high strength, hardenable parts; and Stainless Types 302B and 316 for corrosion resistance. Such powders are available from stock. Special compositions are available to your requirements.



VANADIUM-ALLOYS
STEEL COMPANY
Latrobe, Pa.

For more information circle No. 89 on the Reader Service Card

NEW PRODUCTS—cont.

PLATEN GRINDER
. . . uses serrated contact

By backing up an abrasive belt with a serrated contact belt and using a serrated contact roll, a new platen grinder is said to increase coated abrasive belt life substantially over conventional machines.

The new machine can be used for grinding flat and radius surfaces and with its three stations can allow three men to work simultaneously.

Conventional platen grinders are reported to run the belt over a stationary platen that creates problems such as frictional heat, belt loading and glazing with minimized cutting action and short abrasive life. The new grinder employs a 175" long serrated contact belt behind a 226" long abrasive belt.

The serrations on the contact belt flex the coated abrasive belt setting up a fast cutting action and greater chip clearance maintaining clean, cool, cutting efficiency.

The Carborundum Co.
For more information, circle No. 208 on the Reader Service Card

10 INCH DIFFUSION PUMP
. . . is highly versatile

A new versatile high vacuum diffusion pump for moderate sized vacuum systems has been announced. The model H-10-P pump is a ten inch diameter fractionating diffusion pump which can also be used as a booster pump. When using Narcoil-40 fluid, the pump has a speed of 1700 liters per second in the pressure range from 5×10^{-4} to 5×10^{-8} mm of mercury. It has a throughput of 3800 liters per second at 10 microns and blanks-off below 1×10^{-6} mm of mercury. The maximum tolerable forepressure is 200 microns.

The same pump can be used as a booster when Narcoil-10 is used as the pumping fluid. Pumping speed at 1 micron is 2000 liters per second and the pump has a throughput of 6000 liters per second at 10 microns. Blank-off is below 1.5×10^{-4} mm of mercury. The maximum tolerable forepressure is 400 microns.

Naresco Equipment Corp.
For more information, circle No. 212 on the Reader Service Card

AUTOMATIC DEW POINT CONTROL
. . . of carbon potential

Recently introduced, a new automatic dew point controller is being applied to control the carbon potential of furnace atmospheres.

By simply setting the control point on the instrument at the carbon balance desired the instrument automatically compensates for changes in gas-air ratio, changes in gas composition, etc.

The carbon content range that can be covered by the instrument is from 0.30 to 1.5 percent carbon, the corresponding dew points being from +70F to -5F.

Lindberg Engineering Co.
For more information, circle No. 214 on the Reader Service Card

ULTRASONIC CLEANER
. . . uses flat transducers

New, low frequency flat transducers developed for ultrasonic metal degreasing equipment improve the efficiency of ultrasonic cleaning methods and greatly extend the size of workpieces that can be handled.

Continued on page 86

For more information circle No. 25 on the Reader Service Card

New! Rapid Fire Model
Free Cycles OVER 3,000 SHOTS PER HOUR!
DCMT is the Biggest-Selling Die Casting Machine
in these Industries
WATCH CASES
TOY GUNS
SEWING MACHINES
MECHANICAL PENCILS
RAZORS
CUTLERY
LOCKS
MOTORS
SMOKING ACCESSORIES
FURNITURE HARDWARE
DRAPERY HARDWARE
EYE GLASSES
CANDELABRA
BUILDER'S HARDWARE
ARMAMENT
BUCKLES
TOY AIRCRAFT
ELECTRICAL CONNECTORS
LIGHTING FIXTURES
NAME PLATES
. . . and here's why!
• Extreme casting speed permits lowest cost, single cavity molds
• Highest grade, milky-white "hardware" finish • Special DCMT prefab die blocks mean fast die delivery, tooling economies
• 2-3 minutes to change dies • Lowest operating cost, lowest maintenance, least floor space .
. . . and it's the safest, lowest-priced machine on the market!
Write today for 24-page book, explaining entire process and DCMT packaged die-casting shop
DCMT DIE CASTING MACHINES
Division of British Industries Corp., Dept. 2
Port Washington, New York
DIE CASTING SMALL PARTS

Don't be Misled-
we own Our Own Quarry!

CHIP SIZES LIMESTONE & GRANITE

Chip Size	Pass Thru	Stay on Top
No. 1	1¾" Screen	1¼" Screen
No. 1A	1¾" Screen	1½" Screen
No. 1B	1½" Screen	1¼" Screen
No. 2	1¼" Screen	⅞" Screen
No. 2A	1¼" Screen	1" Screen
No. 2B	1" Screen	⅞" Screen
No. 3	⅞" Screen	⅝" Screen
No. 3A	⅞" Screen	¾" Screen
No. 3B	¾" Screen	⅝" Screen
No. 4	⅝" Screen	5/16" Screen
No. 4A	⅝" Screen	½" Screen
No. 4B	½" Screen	5/16" Screen
No. 5	5/16" Screen	⅛" Screen
No. 5A	5/16" Screen	3/16" Screen
No. 5B	3/16" Screen	⅛" Screen

CHIP SAMPLES & SAMPLE PARTS PROCESSED FREE

The Original
PROCESSED LIMESTONE HONING CHIPS

PROCESSED RED GRANITE TUMBLING CHIPS

Contact Your Exclusive Distributor or us direct.

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14337 MANSFIELD • DETROIT 27, MICHIGAN

For more information circle No. 109 on the Reader Service Card

THE FINISHING TOUCH

WHAT IS AN L. V.* REPORT?

by D. J. Swaninger
Sales Manager—Stevens Compositions

Back in 1953 Frederic B. Stevens, Inc. made the first announcement of their L. V.* Report service. L. V.* means Laboratory Verified.

For some 20 years Stevens had continued to research and develop superior products in the composition field. We felt the experience and facilities of our laboratories would be of great assistance to our customers—so the L. V.* Report service was started.

During these three years we have met and solved many new problems and hundreds of various reports on file attest to benefits to our customers.

An L. V.* Report works like this: You send us several samples of parts for experimental polishing and buffing. You tell us how you are operating at present, give us your problem and what you desire to accomplish.

Shortly and without obligation you will have your Stevens L. V.* Report and recommendations. For polishing—type of wheel or belt, diameter, width, r.p.m., abrasive, composition. For buffing

—description of buff and diameter and r.p.m. and composition used. For coloring—description of buff, number of sections and compositions used. Similar information is furnished for brushing or deburring operations. The L. V.* Report represents the sequence of operations with the type belts, wheels, buffs and Stevens buffing compositions recommended and verified for your job. When your finishing operation may be improved with automatic equipment such recommendations are also included in the report.

Stevens L. V.* Report service was developed for you. Why not write us today?

FREDERIC B.
STEVENS
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

Circle No. 107 on the Reader Service Card

NEW PRODUCTS—cont.

Low ultrasonic frequencies have greater penetrating ability and therefore greater cleaning efficiency than the higher frequencies previously employed. In the new equipment, low frequency ultrasonic waves, generated by barium titanate transducers of new design, freely curve around corners and sharp angles, penetrate more easily into recesses and capillaries to remove all dirt, oil, grease, chips and lapping compound from the article to be cleaned.

Circo Equipment Co.
For more information, circle No. 213 on the Reader Service Card

METAL POWDER PRESS . . . with automatic operation

A new fully automatic "Super Press" for compacting powdered metal and ceramics has been introduced.

Important features of the new press include smooth toggle motion with fast approach to the die cavity and slow final entry into the die. This feature of operation makes it possible to produce parts of superior structure.

The press features a floating die table that can be dimmed in relation to the upper punch so that parts of more uniform density can be produced. An hydraulic cushion combined with an electrical cut-out switch disengages the clutch in case of over pressing. The die fill has a micrometer adjustment.

Arnold Ceramics, Inc.
For more information, circle No. 209 on the Reader Service Card

HYDRAULIC HOSE . . . for fire resistant fluids

Designed specifically for use with the new fire resistant fluids, an hydraulic hose is now avail-

For precision cleaning of molds and dies—

NEW PANGBORN HYDRO-FINISH

gives you: Fewer moving parts—Easier handling—Added efficiency

Now Pangborn's famous Hydro-Finish is yours with added convenience and efficiency! Holding fine tolerances, Hydro-Finish cleans molds and dies in minutes... offers many new advantages. Pangborn has done away with the pump; air jet sluriators now keep the abrasive in suspension. This means a lower investment and fewer moving parts. Optional loading stand simplifies handling, washing and inhibitor application. The cabinet has been redesigned for more efficient operation. These and other advantages make the Pangborn Hydro-Finish ideal for precision cleaning and finishing!

For further details on Hydro-Finish, send for Bulletin 1403 now! Write: PANGBORN CORP., 3500 Pangborn Blvd., Hagerstown, Md.

Pangborn

BLAST CLEANS CHEAPER

Circle No. 103 on the Reader Service Card

able for medium high and high pressure hydraulic systems.

The development of the new hose resulted from the increasing use of fire resistant hydraulic fluids by die casting plants, foundries and other industrial users of hydraulic systems. These fluids presented problems of interior swelling and breakdown of the hose when used in lines containing standard Buna N and Neoprene bases.

Aeroquip Corp.
For more information, circle No. 210 on the Reader Service Card

TUMBLING BARREL . . . handles 3 loads at once

Designed specifically for the small shop with many various sized loads to tumble, a new barrel unit provides three different sized barrels that operate simultaneously.

Each machine is fitted with a 1.1 cu. ft., a 2.0 cu. ft. and a 5 gal. barrel. The 1.1 and the 5 gal. barrels are mounted on one side and the 2 cu. ft. barrel on the other to secure balance on the drive shaft.

The unit requires a ¾ HP motor and has a built in variable speed drive from 12 to 36 RPM. Barrels can be furnished with vinyl plastic linings.

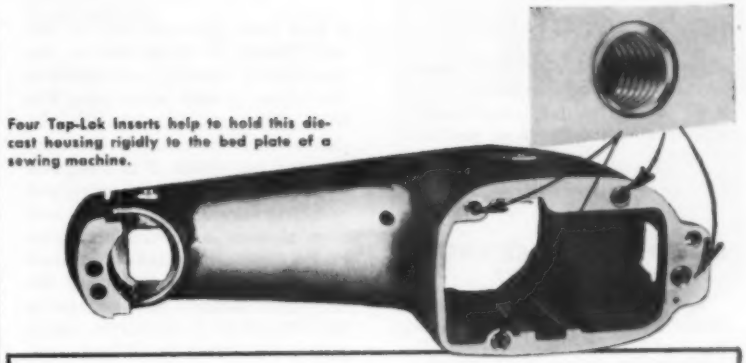
Rampe Mfg. Co.
For more information, circle No. 211 on the Reader Service Card

HIGH SPEED BELT GRINDER . . . steps up production

Designated as a super-speed belt grinder, a new abrasive belt machine uses speeds in excess of 10,000 sfm. At these high belt speeds, production has been increased as much as 300 percent and belt life increased up to 3000 percent according to the manufacturer.

At the high operating speeds there seems to be a marked decrease in loading, so much so that previously discarded belts have been reused. Operators report smoother operation with less work pressure and an absence of any bumping tendency ordinarily due to loading. Work is more easily held to tolerances it is reported.

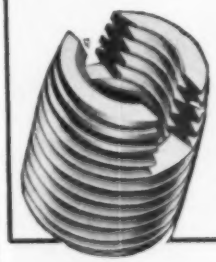
Continued on page 88



Four Tap-Lok Inserts help to hold this die-cast housing rigidly to the bed plate of a sewing machine.

TAP-LOK* INSERTS

make strong points of the weak spots in your assemblies



Tapped threads in non-ferrous materials are often trouble spots unless protected by some sort of hard bushing. Among the latter the TAP-LOK INSERT has all the good points of other bushings, plus the additional feature of being self-tapping. This, of course eliminates a separate tapping operation and reduces installation costs substantially.

Installation is fast and simple, no fussy hole preparation is necessary, thread crossing is impossible, no secondary operations are required, and installation for production or for maintenance can easily be handled by unskilled operators.

TAP-LOK INSERTS withstand vibration without loosening and have maximum torque-and-pull resistance. One simple driving tool, operated through a standard tapping attachment in a drill press or by hand, is all that is required.

U. S. Patent 2,455,885

*Reg. U. S. Pat. Off.

Send for descriptive folder.

Also manufacturers of Groov-Pins for positive locking press fit.

GROOV-PIN CORPORATION

1122 Hendricks Causeway Ridgefield, New Jersey

For more information circle No. 96 on the Reader Service Card

One model of the high speed unit is now available using a 1½" x 60" belt. The machine is available in either a bench or pedestal mounting.

Anchor Machinery Co.
For more information, circle No. 218 on the Reader Service Card

RECIPROCATING EXTENSION . . . for die filer

To increase the versatility of their Di-Profiler the manufacturer of this machine has brought out a flexible rod extension with a ball joint diamond file on the end. Design is such that a reciprocating action, adjustable from 0 to ¼ inch is secured. The ball joint action permits the abrasive face to conform to any contour for which it is designed.

Commonly used for honing and finishing cavities of molds and dies as well as forms and precision contoured pieces that can't well be reached by normal file or finger action, this extension attachment is particularly valuable for tool and die makers.

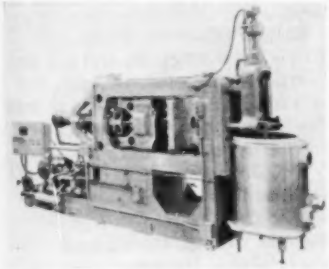
For fine lapping and honing

work the abrasive may be varied. The ball joint end piece may be shaped to suit any purpose and the light spring steel extension rod is purposely designed to discourage overload.

Nord International Corp.
For more information, circle No. 215 on the Reader Service Card

DIE CASTING MACHINE . . . has one piece frame

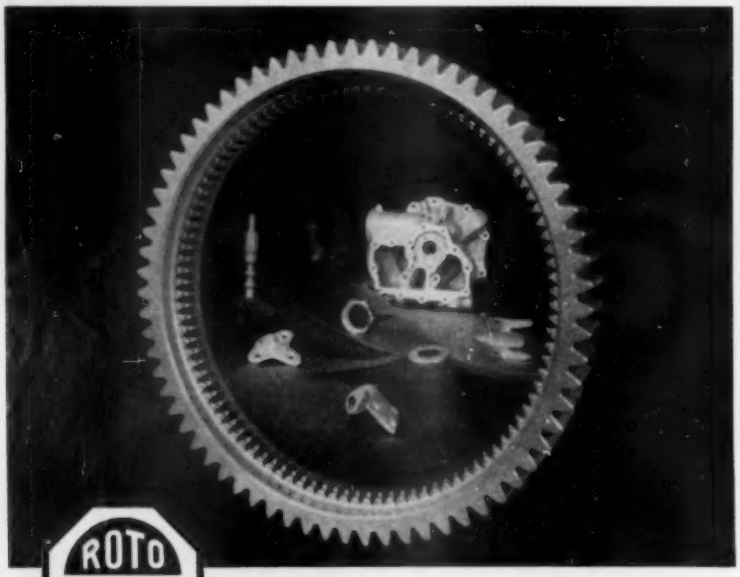
A 600 ton zinc die casting machine which is said to offer more features than any other machine in its class has been introduced. The HP-3Z-SF is designed to cast up to 15¼ pounds of zinc or proportionate weights of lead or tin.



Only one adjustment of any kind is required to set up the zinc end correctly, as the entire shot system is located in machined slots in a one-piece yoke. Furnace and melting pot are large, easily fed or emptied and independent of the machine itself. Both shot speed and pressure are adjustable, with an ASME approved nitrogen accumulator giving high speed injection. Plunger tip is heat treated steel with piston rings. Two fixed shot positions are provided.

600 tons of pre-load clamping is made possible by the one-piece alloy steel frame with its enormous beam area, equal to 8" tie bars. This solid, precision finished frame also insures permanent parallel alignment of the platens. Die set-up is a simple task because of the single hand crank die height adjustment. Die opening is 14".

The movable platen, completely unobstructed, is 40" wide, with a



ROTO FINISH

it's the finish that counts!

Roto-Finish maintains exact tolerances on precision parts with no significant dimensional changes. It makes possible a wide range of finishes applicable to parts of almost any size or shape; finishes a variety of materials — at big savings in manpower and costs. Without obligation, send sample unfinished parts to us. Include finished part for guide and your specifications. Roto-Finish will finish parts in its laboratory. You get a complete process report. You are guaranteed results and a finish that counts!

WRITE FOR FACT-PACKED ROTO-FINISH CATALOG NOW

Roto-Finish COMPANY
3716 Milham Road, Kalamazoo, Michigan
Originators of the Roto-Finish Process
P. O. Box 988
Phone 3-5378
For more information circle No. 105 on the Reader Service Card

vertical clearance between the beams of 28¼". It is supported on hardened steel gibs and can't bend or tip. A 26" x 42" opening in the top of the frame means the die space is accessible from all sides.

Lester-Phoenix, Inc.
For more information circle No. 216 on the Reader Service Card

CONTINUOUS SUMP & LINE FILTERS

. . . for non-flammable fluids

The increased use of non-flammable hydraulic fluids has necessitated changes in filtering equipment.

The makers of Synclinal filters have adapted their sump and line type units to handle all sorts on non-flammable hydraulic fluids. It is reported that all of the features of the filters have been retained in the models adapted for the newer fluids.

The filters are available for either sump or line installations in capacities from 5 to 100 G. P. M. in single unit installations.

Marvel Engineering Co.
For more information, circle No. 217 on the Reader Service Card

CENTRALLY LOCATED PYROMETER

. . . reads 3 to 23 couples

To make one pyrometer do the work of many and to enable an operator to make more rapid readings from a number of thermocouples a selector switch is available for mounting at a central location with a single pyrometer.

Any number of thermocouples, up to 23, are located where desired and wired to the selector switch. By rapidly switching from one couple to another the operator is able to make almost simultaneous readings. Provision has been made on the switch for installing calibrated spools where needed to compensate for widely varying distances to the different thermocouples.

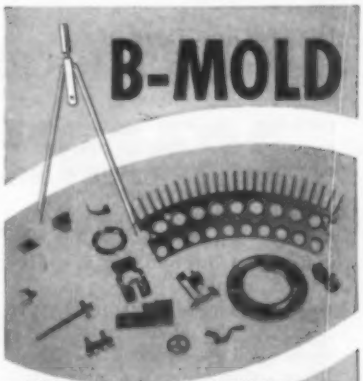
West Instrument Co.
For more information, circle No. 219 on the Reader Service Card

SHOT PLUNGER SPEED

. . . measured with new instrument

A new measuring instrument called the "Celerimeter" makes possible the measurement of very high machinery speeds. The in-

Circle No. 15 on the Reader Service Card



PRECISION NON-FERROUS PERMANENT MOLD

CASTINGS

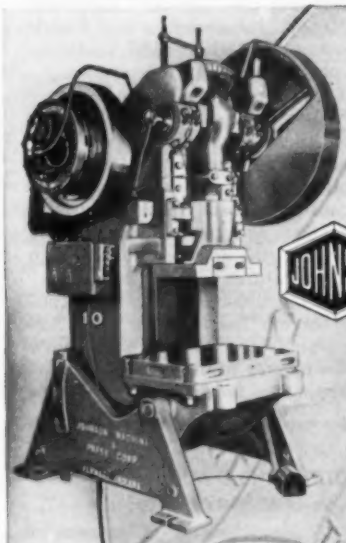
Aluminum Bronzes, Manganese Bronzes, Yellow Brasses, Beryllium Copper and Aluminum Alloys

Consult our Engineering Department, without obligation.

B-MOLD DIVISION

Buckeye Brass & Mfg. Co.

671 N. Main St. • Mansfield, O.



GET MORE PRODUCTION AND SERVICE FOR YOUR DOLLAR with

Bonus Built POWER PRESSES

Rugged, dependable, time-tested Johnson presses have a reputation for adaptability. Versatility in a press earns extra income, for you can handle large jobs. All models available with key or Wichita LOW INERTIA air clutch.

Write for Specification Bulletin 1955
Covering 20 Models 16 to 116 Tons Capacity

for SPEED POWER ACCURACY

the HYDRA-SHEAR

Increase your production to a new high. Shear mild steel up to 10 gauge in three lengths: 6, 8 and 10 ft. Less curl and burring. No gears or clutch.

Johnson MACHINE and PRESS CORP.

620 W. INDIANA AVE. • ELKHART, INDIANA

Visit Us in Booth 411 Sept. 6-17, 1955, Machine Tool Show, Chicago

For more information circle No. 49 on the Reader Service Card

strument is simple to operate and portable; it was developed to measure the straight line speed of moving sections of fixed machinery and equipment.

Measurements from 5" to 30,000" per minute are possible, the instrument measures at 1/100 second intervals.

One example of its use is the measurement of the shot plunger speed on die casting machines. After adjustments are once made to produce the best casting, the speed can be determined and thereafter the plunger regulated through the use of the Celerimeter to maintain the optimum speed.

Lake Erie Engineering Corp.
For more information, circle No. 220 on the Reader Service Card

THICKNESS TESTER . . . for surface finishes

A new non-destructive thickness tester for the metal finishing industry has recently been announced. The new unit is said to permit 100 percent inspection, and will test thicknesses of metals deposited on metals or non-metals deposited on metals.

Said to be the first non-destructive tester which will accurately give direct readings of thicknesses of virtually any coating on any base, the tester should have a wide range of usefulness.

Some of the coatings that have been measured are silver on brass, copper on die castings, nickel on brass, metallizing on plastic and metallic coatings on ceramics.

Unit Process Assemblies, Inc.
For more information, circle No. 221 on the Reader Service Card

METAL OXIDE SEALANT . . . has fast curing cycle

A new metal oxide type sealer with an unusually short sealing reaction time for impregnating castings and weldments has been announced.

The new sealant is a vehicle carrying minerals and metal oxides, effectively eliminates both macro and micro porosity in all types of castings that must withstand either fluid or gas pressure. The same sealant can be used to impregnate welded joints of fabricated parts.

The manufacturer recommends impregnating before machining to secure the best possible surface finish on the castings.

Three grades of the sealant are available. All are identical in composition but vary in particle size so that where only gross porosity must be closed the coarser and cheaper grade can be used.

Prenco Products, Inc.
For more information, circle No. 206 on the Reader Service Card

FLAME SPRAYED CERAMICS . . . coat metals, non-metals

A new process, similar to the well known metallizing process, has been developed for flame spraying of ceramic materials. Metals, lass, ceramics and a wide variety of other solid materials can be coated by this process.

Developed by Armour Research Foundation of Illinois Institute of Technology the process does not require that the metal or other base be heated unduly as contrasted with ordinary ceramic coatings which require heating both metal and ceramic to high temperatures.

An exclusive licensing agreement has been signed with Armour Research Foundation to use the patents in the service contract applicator field.

Continental Coating Corp.
For more information, circle No. 207 on the Reader Service Card

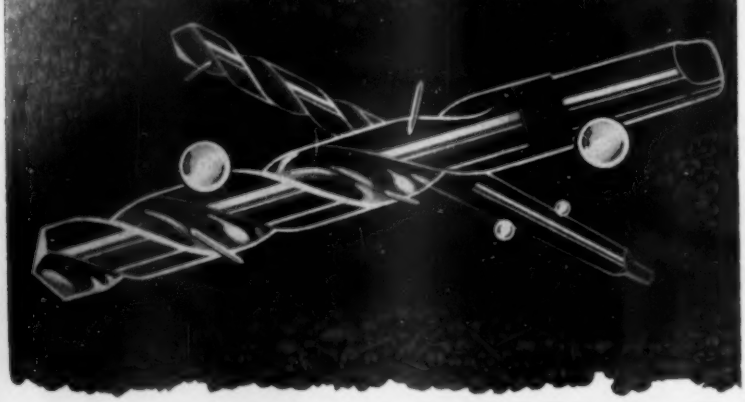
DIRECT FLOW PUMPS . . . for heavy duty

A new line of 6" stroke, 9 plunger reciprocating pumps for heavy duty applications has been announced.

The pumps are rated at 900 bhp and operate at speeds up to 300 rpm with pumping capacities up to 1520 gpm. They are available with six different interchangeable fluid ends and 20 different plunger diameters.

Aldrich Pump Co.
For more information, circle No. 222 on the Reader Service Card

in BURNISHING MATERIALS



It's the SHAPE that counts!

Flutes of Industry's twist drills are often burnished with Abbott Burnishing Balls and Pins for better wear, greater accuracy and less breakage.

Abbott Burnishing shapes — Ball, Ovaball, Cone, Diagonal, Pin — are scientifically designed to make effective contact on metal stampings, castings and machined parts of any size or shape. Each is made from high quality, Abbott bearing ball steel, deep hardened and polished to a mirrorlike, glass hard finish. For all types of barrel burnishing . . . use Abbott.

WRITE for detailed information on how twist drills are burnished. Your inquiry brings prompt reply and new Abbott Catalog-Manual

THE ABBOTT BALL COMPANY
1084 New Britain Ave.
Hartford 10, Conn., U.S.A.

ABBOTT
the all around ball

For more information circle No. 91 on the Reader Service Card

LETTERS TO THE EDITOR
continued from page 6

would greatly appreciate any help you can give us.—H. W. H. (Resident Engineer)

Recently it was suggested to us that we send the enclosed drawing C 287 to you. This is not a working drawing since it shows a proposed design for a part which we would like to have precision cast.

At the present time we are making a part similar to this from a bronze sand casting and machining it. We are spending a very long time in machining this part and it is proving to be very costly. Our hope is to find a concern which could precision cast this part so that we could eliminate to a large degree, if not completely, subsequent machining. We would, therefore, be most grateful to you if you could tell us the names of some companies that might be able to do this for us. — R.T.W. (President). (Editor's note: The drawing shows a cone-shaped piece 5-⅝" high x 2-15/32" diameter, and having a flanged side-opening from base to peak.)

We attempt to supply as much information as possible on sources, or to suggest suitable alternative approaches when the inquirer is seeking an impractical job. However, our readers are invited to let us know if they are interested in supplying any of the castings or services above. — Ed.

3M STORY PUBLISHED

The story of abrasives and adhesives and their contributions to the metal trades is now told in a new book, "Brand of the Tartan."

This 250-page volume by Virginia Huck traces the history of 53-year-old Minnesota Mining and Manufacturing Co., developers of abrasive discs, abrasive cloths and industrial adhesives used throughout the metal industry. It is published by Appleton-Century-Crofts, Inc. at $3.50.

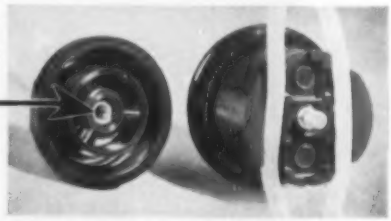
Now! Hopper-Fed
FEMALE THREADS
automatically
WITHOUT DRILLING OR TAPPING

Now, for the first time, amazing new techniques permit the insertion of hopper-fed female threads in molded plastic parts, die-casting alloys, powdered metals and other soft, light materials—automatically, *without costly drilling or tapping!*

Heli-Coil PIP** push inserts have been developed by the Heli-Coil Corporation over years of exhaustive research and testing for use in *mass production* runs of 100,000 or more. These PIP push inserts are pushed directly into cast or molded, blind or through-holes. They provide female threads for standard industrial specifications of thread fit (usually Class 2) —at less than one cent (1¢) per thread *installed.*

Heli-Coil Corporation will rent you an automatic PIP push insert machine to match your production cycle for a nominal monthly charge. This PIP push insert machine has already been proved in a number of successful installations. Send the coupon below for your free copy of our Standard PIP push inserts Application Chart. This unique chart will enable us to discover quickly without a salesman's call, whether ***Heli-Coil*** PIP push inserts will save you time and money. We maintain a top-flight staff of thread engineers and, if PIP push inserts are applicable in your case, we'll be glad to consult with you.

Electrical socket cap shows successful application of *Heli-Coil* PIP push inserts. Female thread in cap has sufficient strength to impale two covered wires on contact prongs.



For high-strength applications, we recommend the use of standard Heli-Coil Screw Thread or Screw-Lock Inserts.

HELI-COIL CORPORATION
509 SHELTER ROCK LANE, DANBURY, CONN.

☐ Send Standard PIP push insert Application Chart and other information on this new technique.
☐ Send design data on *Heli-Coil* Screw Thread Inserts.
☐ Send design data on *Heli-Coil* Screw Lock Inserts.

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE_____ STATE_____ © 1955

*Reg. U.S. Pat. Off.
Heli-Coil Corporation: Manufacturer of *Heli-Coil* Screw Thread Inserts, *Heli-Coil* Screw Lock Inserts and *Heli-Coil* PIP push inserts.
For more information circle No. 98 on the Reader Service Card

ESTABLISH FELLOWSHIP

The establishment of a fellowship at the famed Cavendish Laboratory at the University of Cambridge, England, has been announced by Horizons Incorporated, a unique industrial and governmental research organization of Cleveland.

The post-doctorate grant is for work in the field of physics and chemistry of the solid state and will be done under the guidance of Prof. N. F. Mott, director of the Cavendish Laboratory.

Fees, tuition, living expenses and other emoluments usually associated with such study grants are covered in the fellowship. Applicants for the fellowship should write to Dr. John T. Burwell, Associate Director of Research, Horizons Incorporated, 2903 East 79th Street, Cleveland 4, Ohio.

BARREL FINISHING

continued from page 73

ing barrel finishing in place of hand smoothing and deburring operations.

Quantities per hour can be stepped up, with resultant lower unit cost. A manufacturer of business machines has cut piece finishing costs from nearly 2½¢ to less than ½¢, due partly to an increased hourly output from 132 to 640 units.

Some economic factors to consider are:

1. Large quantities of parts may be processed simultaneously by a single operator, often handling several machines at the same time.
2. Many hours of skilled hand labor, such as polishing, buffing, grinding, snagging or filing are eliminated.
3. Because no dust or grit is evolved, the cost of elaborate dust collecting systems is eliminated.
4. Maintenance and repair of one barrel unit is much less costly than for the large number of grinding and polishing wheels otherwise used.
5. Number of rejects can be sharply reduced.
6. The large quantity output prevents delays in subsequent operations while waiting for parts to be finished.

Planning the Operation

Barrel finishing departments are compact, encompassing large volume capacity of output into relatively small floor area. The number and type of barrels cannot be selected in the abstract, but will depend upon the finish requirements, volume of production, space problems, etc. This can best be determined in consultation with the manufacturer of equipment.

One factor that cannot be overemphasized is the need for keeping complete and detailed records of barrel processing. Two examples of such cards are reproduced with this article, indicating the type of information that is considered essential.

Each time it is necessary to make a finishing run of parts that have been recorded, it is a simple matter to find the exact operating schedule and thereby duplicate previous results without any trial run.

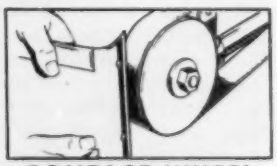
Procedure in starting a trial run is: start the loaded barrel at the recommended speed. Check the work after ten turns, after 20 turns, and then at five and 15 minute intervals. If, after the 15 minute check, no undesirable results appear (scratching, nicking, etc.) continue the run with periodic inspections until the desired result has been achieved. Complete records of all trial runs should be kept for future reference.

THANKS ARE DUE: The editors of PMM are indebted to the following companies for assistance: Almco Supersheen Div. of Queen Stove Works; Abbott Ball Company; Lord Chemical Corp.; Minnesota Mining & Manufacturing Co.; Roto-Finish Company; Norton Company; Universal Tumbling Supply Co.

Hammond of KALAMAZOO

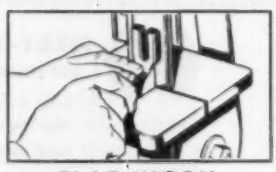
FOR DEBURRING ECONOMY

Model 50-DD



CONTACT WHEEL

IRREGULAR SHAPES



FLAT WORK

It is remarkable how soon these Abrasive Belt Machines pay for themselves in grinding, polishing and deburring.

11 combinations available with or without Duskolector.

"Clip" this ad to your letterhead. 20 page catalog will be sent at once.

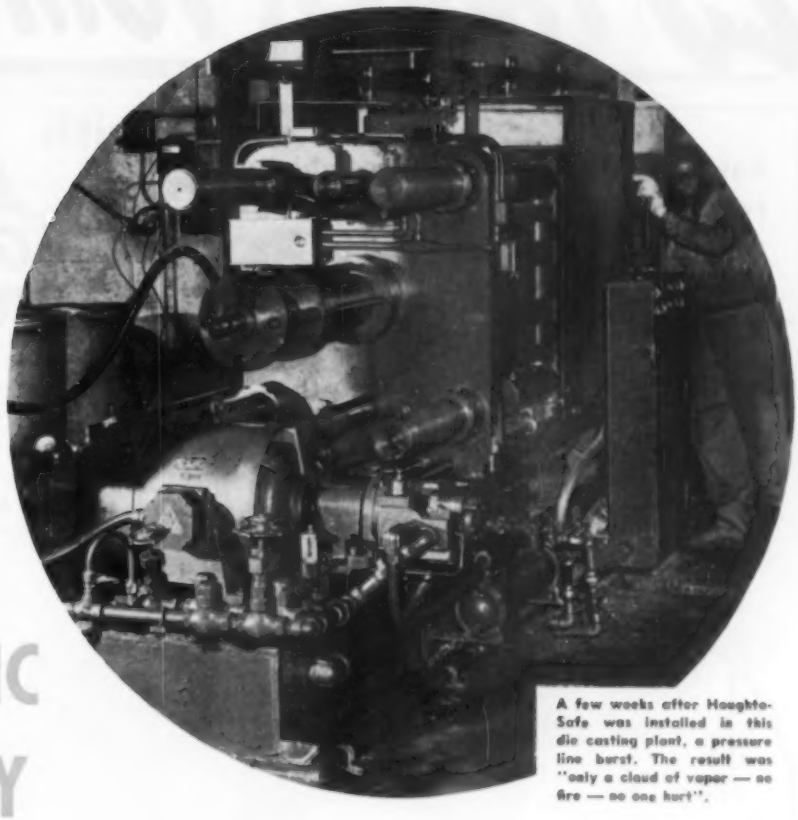
Hammond Machinery Builders Inc.

1642 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

See us at Booth 214, The Machinery Exposition, Chicago Coliseum, September 6-17.

For more information circle No. 45 on the Reader Service Card

Sure you're protected by HOUGHTO-SAFE



A few weeks after Houghto-Safe was installed in this die casting plant, a pressure line burst. The result was "only a cloud of vapor — no fire — no one hurt".

. . . and you're getting HYDRAULIC EFFICIENCY too!

Houghto-Safe is a water-base hydraulic fluid. It is fire resistant—and is just as efficient as it is safe.

Good lubricity protects your machines and parts against wear.

It's also non-corrosive and non-toxic. Prevents rust and corrosion in your hydraulic system. Has no unpleasant odor and is safe for workers to handle.

Houghto-Safe won't attack packings, either—has no ill effect on the standard packing materials you use.

Considering these and its other performance benefits, non-flammable Houghto-Safe should be *your* first choice in operating hydraulic equipment. Ask the Houghton Man how it applies to your particular needs—get latest bulletin promptly, by writing to E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

HOUGHTO-SAFE

a product of

E. F. HOUGHTON & CO.

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Ready to give you on-the-job service . . .

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25% FASTER TUMBLING

Equipment and materials combined to increase direct-labor savings over other tumbling methods!

with

TUMBLE GRAV-I-FLO FINISH

25% More Volume in 30% Less Floor Space!

MODEL 48"
Two Compartments

than comparable machines.

Grav-i-Flo's larger capacity plus improved cutting and finishing materials slash processing time—no need for transferring parts from cylinder between roughing and finishing. Get speed *and* smoother surface, higher lustre by asking for a Grav-i-Flo representative to visit your plant, or by sending us samples.

SEND FOR CATALOG showing complete line of Grav-i-Flo equipment, accessories and supplies.

Grav-i-Flo Corp., Dept. PMM-9, Sturgis, Mich.
☐ Send complete catalog. ☐ Have Sales Engineer Call.
☐ We are sending samples.

Company _____

Name _____ Position _____

City _____ State _____

GRAV-I-FLO CORPORATION, 400 Norwood Avenue, Sturgis, Michigan

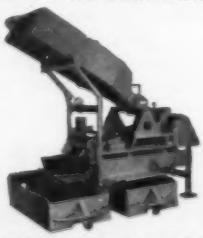
COMPLETE EQUIPMENT, ACCESSORIES AND SUPPLIES

MODEL 66"—TWO COMPARTMENTS

MODEL 36"—TWO COMPARTMENTS

MODEL 32"—TWO COMPARTMENTS

MODEL 24"—TWO COMPARTMENTS



CHIP SEPARATOR AND GRADER

For more information circle No. 97 on the Reader Service Card

TOMORROW'S DIE CASTINGS
Continued from page 52

ground) are a common component of furniture, cabinets, workshops, etc. Notice the integral features that are cast into these accurate little gadgets: internal splines, external threads, square-shouldered round bosses; intricate side slots for tumblers. These zinc die castings would be expensive and difficult to produce by ordinary machine shop methods. The two padlocks, heavy, durable and theft-resistant, are likewise time-proven uses for zinc die castings.

From Japan: The large scale production of the Japanese optical and photographic industries has been responsible for advances in the die casting technology of that country, especially in the light metals. Cameras and binoculars, which are important export commodities of Japan, are built of die castings.

For Example: Three quality magnesium die castings

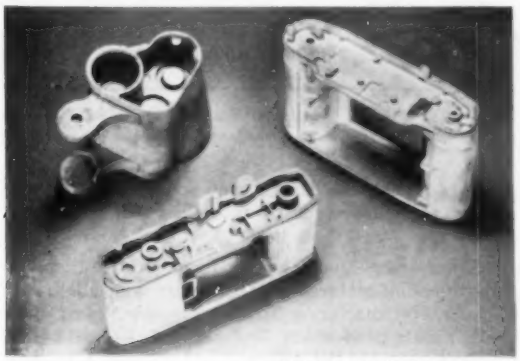


Photo: Tanaka Die Casting Co., Ltd.

used to house binoculars and cameras are for new products. These are being produced in a commercial die casting shop in Tokyo.

Model Builders: An important hobby activity is the construction of model railroads and railroad equipment. It is doubtful that this field of manufacturing could exist without the fine surface detail, precision and low cost of die cast zinc.

Photo: Model Engineering Works

For Example:
This railroad caboose requires three die castings for the body, 14 for the two trucks. Four screws hold the complete assembly together. Weight, fine details

Continued next page

—it took a lot of "know how" to produce

RIGHT from the very start of the design (which must be done with a thorough understanding of the problem and solution) to the delivery of the finished die casting to you, every step of production is controlled by a combination of factors . . . the hands of an expert, the watchful eyes of an inspector. Yes, each employee at Paramount is an expert in his field — fully trained in individual requirements for production, quality control and all other factors, so necessary to meet today's demands for skill and accuracy in the die casting process.

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Write for this free brochure. Or better still let us advise you on engineering and design of your die casting job. No obligation.

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Paramount

DIE CASTING COMPANY

St. Joseph 8, Michigan

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No *HOUSING* Problems with LITEMETAL

Magnesium and Aluminum Die Castings

Manufacturers of power tools and equipment, and of many home and office appliances, have discovered the advantages obtained by using the new lightweight alloys for housings, shrouds and covers. Their smoothness of finish provides merchandisable, eye-pleasing, exteriors for products . . . establishes them in a more competitive position in the retail market. Of great importance too: they provide for the manufacturer, mounting bosses, lugs, and core holes, and virtually eliminate machining, finishing and assembling time. Further advantages are obtained by the use of magnesium and aluminum die castings in the definite reduction of shipping weights. For any type of "Cover-Up", or for any other job where these lightweight metals can be used, LITEMETAL DICAST can probably solve your problem.

Let's Talk It Over . . .

LITEMETAL DICAST, INC., is an organization of specialists—men thoroughly experienced in the casting and machining of magnesium and aluminum alloys. Our equipment includes big machines for big jobs—little machines for little jobs . . . the right sizes and types of the most modern die casting equipment for producing parts from the size of a button to large structural parts. Complete facilities for secondary operations are also available.

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LITEMETAL DICAST, Inc.

A DIVISION OF HAYES INDUSTRIES

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PLANT AND EXECUTIVE OFFICES

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obtained, and good wearing qualities are reasons for choosing zinc die castings.

Bezels: One of the most widespread uses for die castings is for bezels used on instruments, appliances, electronic equipment, etc. This gives a trim, neat, low cost frame, easy to mount, adaptable to many models, and suitable for attractive finishes.

Photo: Hewlett-Packard Co.

For Example: Hewlett Packard Co. uses this die cast zinc bezel on the cabinets of several instruments, such as audio oscillators, and other laboratory devices.

EQUIPMENT TREND
continued from page 56

put into use for die casting zinc and promises to cut melting and alloying costs, as well as reducing metal losses.

Recently perfected also is a furnace for automatically injecting metered shots of aluminum alloy into cold chamber machines. This development is now set for full scale production. One Eastern die caster has production-tested the unit and has ordered a battery of five.

A double-chamber aluminum melting furnace with a sloping hearth has recently been introduced, with melting taking place in an upper chamber and running down a non-wetting refractory slope into the dip-out chamber.

Most radical furnace development is probably the continuous melting and automatic pouring furnace described in detail on page 109 of this issue.

Vacuum die casting, using conventional die casting machines with special sealing and evacuating systems, also reached commercial production this year, for some "problem" die castings where surface quality, pressure-tightness, plateability, etc., have plagued producers. Two firms have announced their operation of vacuum die casting facilities.

On the technological front also is the work being done under auspices of the American Die Casting Institute's Research Foundation. Concentrated effort of this group, whose research is being carried out at Battelle Memorial Institute, has been directed so far toward the development of improved die steels and the related problem, die lubrication. Progress on these studies will be reported at the organization's meeting this month.

DATA IN ADS
continued from page 20

102. ELECTROCLEANING METALS prior to plating or to prevent tarnishing is described in three booklets that have been prepared by Oakite Products, Inc.

103. HYDRO-FINISHING, a method developed by the Pangborn Corp. for super finishing of molds and dies is fully described in bulletin no. 1403.

104. AUTOMATIC TAPPING at high speeds and with a degree of sensitivity that no thread distortion and substantially 100 percent perfect threads is possible with the new unit from Procunier Safety Chuck Co. Their bulletin completely describes it.

105. MAINTAIN EXACT DIMENSIONS during the finishing operations with Roto-Finish Co. equipment and media. A new data packed catalog is available.

107. LABORATORY VERIFIED finishing procedures almost guarantee a perfect job. To learn more about it get information from Frederic B. Stevens, Inc.

108. CHROMATING OF ZINC to secure a desirable finish is both possible and practical by methods developed by United Chromium Div. of Metal & Thermit Corp. Detailed information is available.

110. HIGH SPEED DIE CASTING of small parts, up to 1½ pounds of zinc, can be done on the ABC Machine. Engineering data and prices are given in bulletin A-10 from A. B. C. Die Casting Machine Co.

37. A DIE CASTING bulletin that gives factual information on how Gries Reproducer Corp.'s unique facilities for making tiny die castings may lower manufacturing costs is now available.

106. BARREL FINISHING MEDIA that is reported to be revolutionary in producing the color, lustre and finish desired is described and samples furnished by Rutley Industries, Inc.

72. THE MAGIC OF DIE CASTING is explained in a brochure that has been prepared by Paramount Die Casting Co. Given are typical examples of ssavings and a description of the facilities available.

43. "DIE CASTINGS," a file folder which shows how to step up production and cut costs has been issued by The Hoover Co.

1
2
3
Recessed lettering on this oven control (1) requires raised letters in the cavity. Yet, from one master hob (2), you get multiple molds or dies with raised lettering (3), in any quantity, with a minimum of machining, filing and polishing.

Raised Lettering in Your Molds . . .
Easy and Economical with

NEWARK DIE HOBBED CAVITIES

For lower tool costs and faster production . . . especially with multiple molds of complicated design . . . die hobbing is the method to choose. Because every cavity is cold pressed in steel from the same master, lettering and design details are always uniform. The high hobbing pressures (up to 100 tons per sq. in.) also cause the steel to flow and condense alternately, resulting in a closer surface grain structure. This provides an exceptionally long lasting luster . . . insures maximum fidelity of reproduction in the final product.

WRITE for your free copy of "How and When to Hob." Or let us discuss directly how Newark's complete die hobbing facilities and experience with all sizes and types of cavities may benefit you. No obligation, of course.

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ADCI MEETING
continued from page 60

The use of industrial publicity to help create wider markets for die castings by stressing examples of job-shop know-how in new, unusual and economic applications will be on display and 1956 plans will be discussed.

Opening Wednesday, September 14, the Annual Meeting will get under way with a business session at which the Annual Reports of the Officers, Regional Groups and Committees will be followed by a review of the Certified Zinc Alloy Plan.

On Wednesday evening, the annual banquet will feature the presentation of the American Die Casting Institute Annual Doehler Award. Charles Pack, former vice president of Doehler-Jarvis, the 1955 recipient of the award, will also be the guest speaker at the banquet.

A meeting of the Die Casting Research Foundation on Thursday will conclude the meeting.

ACCURATE Magnesium Die Castings . . . a new note in WURLITZER ORGAN quality

Large two piece magnesium die cast reed holder produced for the Wurlitzer Co.

The change from a heavier metal casting to ACCURATE magnesium die castings reduced weight and production costs for the Wurlitzer Co. Priced competitively with heavier metal castings, these matched magnesium die castings were lighter to handle, machine, and assemble . . . are shock-resistant . . . non-rusting and dimensionally stable. ACCURATE die casting engineers would welcome the opportunity to work with you in adapting magnesium die casting to your product. Write today for recommendations and cost estimates.

Here are a few additional advantages combined in each ACCURATE Magnesium Die Casting:

- Light Weight
- High Strength
- Low Cost
- Fine Surfaces
- Close Tolerance
- Uniformity
- Laboratory Controlled Quality

Major Producer of Aluminum, Zinc and Magnesium Die Castings

ACCURATE DIE CASTING CO.

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For more information circle No. 1 on the Reader Service Card

PYDRAUL F-9 GETS UNDERWRITERS' O.K.

Monsanto Chemical Company's Pydraul F-9, a fire-resistant synthetic hydraulic fluid, has become the first such fluid to be listed by Underwriters' Laboratories, Inc., according to an announcement by the company's Organic Chemicals Division.

Following more than a year of UL flammability tests, the fluid has been given a fire hazard rating of 2-3, "much less flammable" than petroleum oil. The rating is based on UL's standard of classification for fire hazard of liquids in which ether is rated 100, gasoline is rated 90-100, ethyl alcohol is rated 60-70, kerosene is rated 30-40 and paraffin (petroleum) oil is rated 10-20.

Developed by Monsanto in 1950, Pydraul F-9 is a stable, non-corrosive fluid which, in addition to its extreme fire-resistance, provides a lubricity equivalent to that of premium-grade petroleum fluids. It is used in hydraulic equipment operated near heat or other potential ignition sources, particularly in die casting and a wide variety of steel industry applications including billet-handling equipment.

Underwriters' Laboratories, Inc., is sponsored by the National Board of Fire Underwriters and is that organization's official testing facility. Its listings are on file with a reported 250 insurance, safety and related organizations. Approximately one million industrial and consumer products have been tested and given UL listings to date.

INDUCTOTHERM MOVES

Inductotherm Corp., manufacturer of the Inducto line of high frequency heating and melting equipment, has moved from Glenolden, Penna. to a larger, more modern plant at 412 Illinois Avenue, Delanco, N.J.

According to H. M. Rowan, president, the move was necessary in order to consolidate the company's rapidly expanding engineering, manufacturing and sales operations at one location.

Introduced about one year ago, the Inducto heating and melting furnaces have brought to industry a quick, positive, and economical method for handling large production runs and laboratory or pilot plant melts of metals and alloys.

OPPORTUNITIES

Rates: $20 for the first column inch, $15 for each additional inch payable in advance

POSITION WANTED — Metallurgical engineer, age 34. Presently employed as die casting process engineer. Experienced in casting aluminum, magnesium and zinc. Professional background includes engineering, management, inspection and maintenance of die cast machines and melting furnaces. Seeking industrial management position with progressive die casting or foundry company. Complete resume and reference on request. Will relocate. Write Box 9155, PRECISION METAL MOLDING magazine.

DIE CASTING MAN WANTED — Experienced in jobbing production work on aluminum die casting operations. Must be able to supervise all phases of die repair, maintenance problems and production methods. Engineering degree is preferred but not necessary. This is a good opportunity for a young man experienced in the die casting field who has the ability, energy and interest to join an expanding industry in the New York-New England area. Write giving age, education, experience and salary desired. All replies will be treated with strict confidence. Write Box 9255, PRECISION METAL MOLDING magazine.

WANTED — Used ABC or DCMT die cast machine. Quote price, size, condition and age of machine. Fort Recovery Industries, Inc., Fort Recovery, Ohio.

SALES ENGINEER POWDERED METAL PARTS — Well established powdered metal parts manufacturer desires experienced sales engineer. Excellent opportunity and growth potential. Advise regarding experience and salary requirement. All replies will be held in strict confidence. Write Box 9355, PRECISION METAL MOLDING magazine.

SUPERVISORS — Expansion program necessitates acquisition of additional supervisory staff in areas of inspection-quality control, casting and wax-molding and investing. Background in investment casting desired, but men with experience in ferrous metals will be considered. Supervisory experience is essential. Precision Castparts Co., 5001 SE Johnson Creek Blvd., Portland 6, Oregon, Attention K. H. Pierce.

WANTED: Experienced tool and die setter and experienced project engineer for powdered metal plant. Write giving qualifications and salary expected. Reply to Box 9555, PRECISION METAL MOLDING magazine.

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INTERESTED IN
CO-OPERATIVE
MANUFACTURING
DEAL WITH QUALIFIED
ENGINEER HAVING
PRODUCTION KNOW-HOW
AND PRODUCT CONTACT.
Write Box 9455, PRECISION METAL MOLDING magazine.

MAGNESIUM PRICE UP

A price increase of four cents a pound for primary magnesium pig and ingot effective Tuesday, August 16, has been announced by The Dow Chemical Company.

ALLIED RESEARCH EXPANDS

Allied Research Products, Inc., Baltimore manufacturers of the Iridite line of chromate conversion coatings for non-ferrous metals and ARP plating chemicals, has announced the establishment of warehouses in Cleveland, Ohio; Detroit, Michigan; and Chicago, Illinois.

IN THE WEST IT'S . . .

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***Preferred* when only the best is good enough**

When you buy your die castings from Universal, you are gaining the services of experienced die casting engineers, die designers, production men and management. You are putting a well-equipped shop to work on your castings. You will find, as hundreds of other companies have, that you can depend upon Universal for quality, service, delivery and prices that will help keep your own production costs down.

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First Year Accomplishments Win Award For Fast-Growing Investment Casting Institute

A newcomer grabbed one of the annual "oscars" awarded by the American Trade Association Executives for distinguished service.

The newcomer is the Investment Casting Institute, a trade association which in a little over a year has succeeded in winning the highest possible honor in trade association work. In the 26 year history of this national award no other trade association has accomplished this objective in so short a time.

Results of the annual competition were announced at the annual ATAE meeting at Mackinac Island, Michigan, during the first week in August. Criteria for judging are distinguished service to industry, to industrial development, and to the public as a whole, or some important segment of the public.

The Hon. Sinclair Weeks, U. S. Secretary of Commerce, was chairman of the awards jury which selected the winners. Other members of the jury were Clem D. Johnston, president of the U.S. Chamber of Commerce; Henry G. Ritter III, president of the National Association of Manufacturers; Dean Richard L. Kozelka, School of Business Administration, University of Minnesota; Dean Russell A. Stevenson, School of Business Administration, University of Michigan.

Dean Stevenson made the presentation to Harry P. Dolan, executive secretary of the Investment Casting Institute as the winner of the national and regional association group with an annual budget of less than $50,000.

The Investment Casting Institute was organized in December, 1953, under its first president, K. M. Bartlett, Thompson Products, Inc., as the industry trade association for producers of investment castings. In its first

Continued on page 102

AWARD IS PRESENTED to Harry P. Dolan, secretary of the Investment Casting Institute (center), by Dean Russell A. Stevenson of the University of Michigan's School of Business Administation (right). Looking on is Howard A. Prentice, president of ATAE.

These Projects Are Now In The Works As ICI Pushes Ambitious Programs On Design Manual, Standards, Materials

A drafting and design manual which will analyze the factors affecting tolerances in investment casting is one of the primary projects now underway by the Investment Casting Institute.

Another important project of the Institute is the establishment of classifications and specifications for all materials other than metals used in the industry. These activities will fall under the Institute's Process Materials Standard Committee. Tests will be developed to determine the optimum properties of the materials so that the supplier and purchaser can control the quality and guarantee conformance of materials with regard to these optimum properties.

A questionnaire covering all types of design will be used to solicit the necessary information for the manual from every manufacturer of investment castings as to the tolerances that can be reasonably expected in each type of design. The Dimension Tolerances Committee of the Institute under the chairmanship of E. G. Chapman of the Misco Precision Castings Company, will analyze the results.

The study of hole tolerances will be under the guidance of Joseph Levine of Investment Casting Company; airfoil tolerances has been assigned to Joseph Stannard of Pratt & Whitney; W. C. Jenkins, Casting Engineers, Inc., has been assigned to industrial component tolerances. Positional tolerances is being handled by H. T. Clinton, Wright Aeronautical, and linear tolerances is the project of R. C. Kramer, Thompson Products, Inc.

A study of surface finishes also will be included in the completed Institute manual.

Walter A. Dubovick, president of the Engineered Precision Castings Company, heads the Institute's new Process Materials Standards Committee. Three subcommittees have been established, Expendable Pattern Materials; Proprietary Investments; and Investment Raw Materials. The former will devote its

Continued on page 107

- Designed for highest speed production
- Built to produce denser, higher precision castings
- Dollar for dollar, the market's best buy

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Don't buy any other machines until you know the story of the new Series D...capacities from 250 to 850 tons.

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year of existence, The Institute completed a comprehensive survey of the size, capacity, markets and weak spots of its industry. It has, through its specific educational and promotional programs, conveyed to designers and engineers of both government and industry, the beneficial attributes of the investment casting process for production of precision metal parts. Through the work of its technical committees, the Institute completed preliminary steps in the development of industry standards for metal specifications, dimensional tolerances, testing procedures and process materials.

Through these many programs and activities, I.C.I. has helped a new and vital industry in its efforts to reach its full potential. Through democratic means this industry is pooling its knowledge and skills to not only give the American public a superior industrial product but to counterbalance the threat of totalitarian technological progress.

In looking to the future the officers and directors of I.C.I. state that the organization will continue to follow the admonition to industry of former President Herbert Hoover: "To so develop its field that the enterprises in it may be conducted with the greatest efficiency and economy."

ICI Officers

Officers of I.C.I. include Ted Operhall, president, Misco Precision Casting Company; vice president Vincent S. Lazzara, Casting Engineers, Inc.; and Harry P. Dolan, executive secretary who holds the unusual honor of being the only American trade association executive ever to win this award for two consecutive years. Dolan who is also executive secretary for the Caster and Floor Truck Manufacturers' Association received a similar honor in 1954.

Directors include K. M. Bartlett, past president of I.C.I., Thompson Products, Inc.; L. E. Brooks, Jelrus Precision Casting Company; P. W. Schipper, Howard Foundry; K. W. Thompson, Thompson Tool Company; A. C. Williams, Crucible Steel Company of America.

In discussing ATAE awards, Secretary Sinclair Weeks observed that "A consistent thread of public service runs through the award entries. And that, it seems to me, is an important matter for each responsible, professional trade association executive to bear in mind. In addition to working for his association members, the trade association executive is also working for the public and he has a duty to maintain the public interest and to present it to his membership in times of decision. Statesmanship and highmindedness pay best in the long run in trade association work as elsewhere."

In stressing the importance of the competition for public service among trade associations, Secretary Weeks pointed out that the first ATAE Award was won in 1930 by the Automobile Manufacturers Association for working out a national cross-licensing of patents; the second to the National Institute of Dry Cleaning for an attack on racketeering within its industry, and the third by the National Paint, Varnish and Lacquer Association for its operation of its Unfair Competition Bureau.

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BADGER quality makes your product more competitive!
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TWO JOIN ICI

The General Electric Company, Foundry Department, Schenectady, New York, and Precision Metalsmiths, Inc., Cleveland, have been elected to membership in the Investment Casting Institute, Chicago, according to an announcement by Ted Operhall, Institute president.

Official Institute representative of General Electric is E. R. Deschger, general manager of the foundry department; representative of Precision Metalsmiths is Robert Miller, company president.

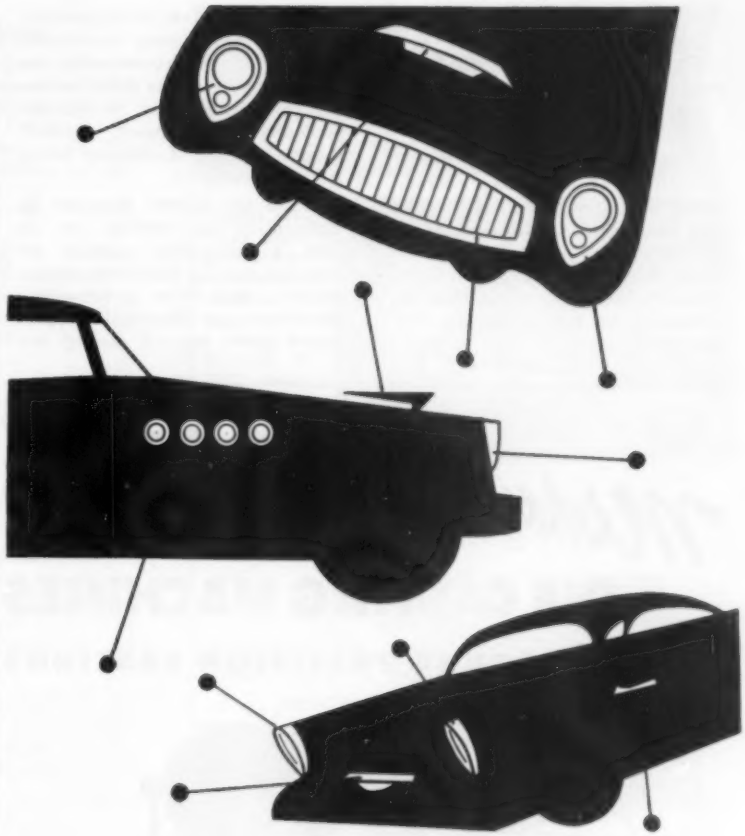
INVESTMENT CASTINGS
continued from page 61

Metallurgical requirements are likewise of great importance. In most cases a definite alloy and specifications are indicated by the customer. Many times the specifications call for other than casting physicals and chemicals. If the customer will specify these requirements in terms of the *results he wants* (physical and chemical properties), it is often possible for the producer to suggest alloys which will be more suitable for the specific application.

Inspection standards often constitute one of the important considerations. Since such standards help determine the end price of the part, this information must be given in detail. To insure minimum rejections, it is also important that the producer inspect with the same procedures as the customer.
tomer.

Accordingly, the supplier needs to know whether the customer wants X-ray inspection, magnaflux inspection, zyglo inspection, chemical analysis, physical properties (all certified) and/or other pertinent information.

The information contained in this report, if observed by both customer and producer results in closer cooperation and thus better end products at minimum cost. We have found at Alloy Precision that it is often beneficial to set up liaison between our technical groups and those of our customers. In this way, all areas of consideration can be resolved, and proper relations can be effected for the benefit of both parties.



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A product of Federated research, Di-METAL is a zinc-base die-casting alloy of unusual purity. Three grades are available to assure you of the exact characteristics you want.

Produced under rigid quality control, Di-METAL is made only of metals of the highest quality. The zinc base is 99.99+% pure; only commercially pure aluminum, magnesium and electrolytic copper are added. Inspection follows every phase of the alloying process to guard against impurities. For example, in the specifications the allowable lead content is 0.007 percent; but a Federated Di-METAL ingot contains .003 percent or less, giving the die caster an extra margin of safety.

Let Federated sales engineers help you get better die castings of any metal. A suitable alloy is available or can be engineered to your precise specifications. Call any of our 13 plants or 23 sales offices across the country.

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METAL SUPPLY

continued from page 43

This year the export of large quantities of aluminum scrap, along with government stockpiling, have reduced the amount of aluminum available. Consequent price rises have resulted which, industry leaders say, can best be corrected by restrictions on the export of scrap.

The participation of representatives of the primary aluminum industry in the round-table on metal supplies at the ADCI meeting this month may be an exploratory step toward possible increase in use of primary metal for die casting.

While the largest increase in automotive die castings are in zinc, a substantial quantity go into the popular automatic transmissions and other power-actuated devices. Household appliances have showed strong increases in the amount of die cast aluminum used, also.

Technical programs aimed at improved die steels for casting aluminum, materials that will make possible the hot chamber die casting of aluminum, and production electroplating of aluminum are now in the works, and may, if successful, have a stimulating effect upon the production and use of aluminum in die cast form.

MAGNESIUM: While still a minor alloy, in terms of tonnage cast, there are indications that more die castings in this light weight metal may be specified during the coming year. Probably the outstanding development which may influence this was the introduction of a hot chamber machine for die casting magnesium. Now available from two manufacturers of die casting equipment, the hot chamber machine speeds the die casting cycle by eliminating the wasteful hand ladling operation. It is said to bring magnesium into competitive relationship with other metals.

So far as is known, only one die casting plant has actually installed one of the new Dow-developed hot chamber magnesium machines for production, but machine builders report great interest in these machines. Some action toward buying more of this type of equipment is expected, probably during the second half of 1956.

Both the metal suppliers and die casters recognize the legitimate concern expressed by one West Coast manufacturer who wrote PMM, "You can well appreciate that when a new product is introduced, it is priced out to the retail trade based upon some logical price of raw materials, labor, etc. When the price of raw material fluctuates to a great extent, it is difficult indeed to establish a proper selling price for a year in advance." As a result, both industries are making efforts to see that stability is achieved in the supply and price of all die casting alloys.

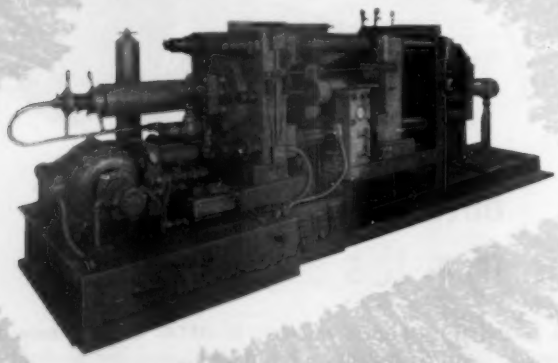
IRON POWDER CONSUMPTION

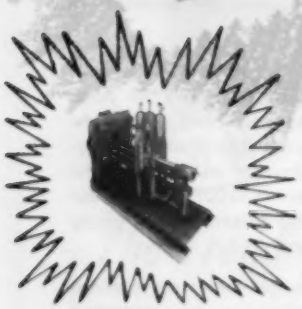
Based on the rate of consumption thus far in 1955, industry will consume almost 70,000 tons of iron powder this year and prospects for 1956 appear even brighter. Almost half will be for powder metallurgy uses.

Midwest-FOSTER

DIE CASTING MACHINES

FOR SOUND PRECISION CASTINGS





A NEW FEATURE! Midwest-Foster — Newly designed JET-SPEED — HI-PRESSURE injection end permits infinite adjustment of shot cylinder — easily and quickly up to 6 inches below center.

Other features include heavy framing and platens, positive clamping action, maximum injection speeds and pressures, hydraulic and electric interlock safety factors, minimum maintenance, all of which guarantee sound precision castings at lowest cost.

Injection assembly permits safe, efficient ladling of metal. Adjustment of jack screw and 2 gland nuts, simplify positioning of shot cylinder. No additional piping or flexible tubing required.

Write for free detailed bulletin and specifications, fully illustrated.

Midwest MACHINE CO., INC.

Manufacturers of Midwest-Foster Die Casting Machines

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For more information circle No. 61 on the Reader Service Card

SCHIPPER NAMED DIRECTOR OF INVESTMENT CASTING INSTITUTE

Peter W. Schipper, general manager of the Investment Casting Division, Howard Foundry, Milwaukee, has been named a director of the Investment Casting Institute, Chicago, according to announcement by Ted Operhall, Institute president. Schipper was appointed to fill the vacancy on the board of directors, occasioned by the resignation of K. J. Yonker.

In addition, Operhall also announced new Institute committee personnel. They include:

Membership committee — chairman, K. M. Bartlett, Thompson Products, Inc.; vice chairman, R. S. Banister, Midwest Precision Castings Co.; Alex Saunders, Alex Saunders & Co.; Roger F. Waindle, Wai-Met Engineering Co.; K. W. Thompson, Thompson Tool Co.; and W. L. Worthen, Bone Engineering Co.

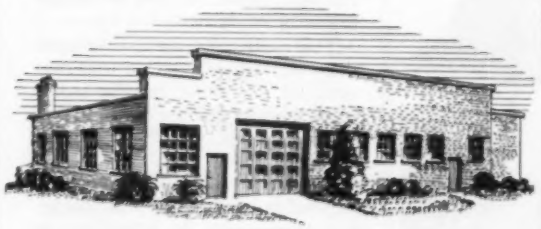
Industry Survey Committee—chairman, L. E. Brooks, Jelrus Precision Casting Co.; A. C. Williams, Crucible Steel Co. of America; K. J. Yonker, Misco Precision Casting Co.; R. D. Gumbert, Alloy Precision Casting Co.; and P. F. Foley, Harcast Co.

Public Relations Committee—chairman, K. M. Bartlett; R. D. Gumbert; David Veit, Precision Metal Molding; A. C. Williams.

Technical Committees—chairman, K. M. Bartlett.

Metal Specifications Committee—chairman, C. Yaker, Misco Precision Casting Co.; Dr. James Freeman, University of Michigan; J. W. Putnam, Engineered Precision Casting Co.; J. E. Srawley, Arwood Precision Casting Co.; and Roger F. Waindle.

Physical and Non-Destructive Testing Committee — chairman, B. W. Duncan, Alloy Precision Casting Co.; Jim Bly, X-Ray, Inc.; T. E. Millard, Thompson Products Inc.; George Poole, Pratt & Whitney Div., The Niles-Bement-Pond Co.; Charles Widstrand, Aviation Div., Ford Motor



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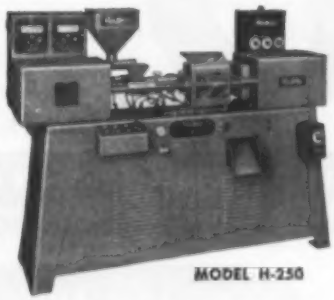
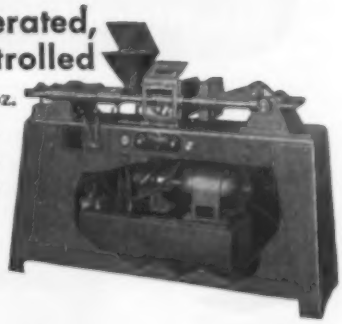
2½ oz. Automatic and 2 oz. Semi-Automatic Presses

These injection presses feature safe, simple push-button controls. Accurate temperature regulation. Rugged, compact, quiet.



MODEL H-250

Power-Operated, Lever-Controlled Presses — 2-oz. or 1-oz. models. Have many automatic and safety features.



MODEL H-200

Plastic Grinder — grinds up waste, rejects, etc., for re-use.

MODEL G-100

Mold Bases for these presses available from stock.
FINANCING AVAILABLE

Write for information on this equipment.

THE VAN DORN IRON WORKS CO.
Cable Address: "VANDORN" Cleveland
2693 East 79th Street • Cleveland 4, Ohio, U. S. A.

For more information circle No. 88 on the Reader Service Card

For more information circle No. 9 on the Reader Service Card

YOU CAN NOW - Get over 100,000 Shots Per Set with AUTO-DIESEL Plunger Rings

Not long ago a few hours service was all anyone expected from a set of plunger rings. Auto-Diesel Engineers developed their new Hardened Steel Plunger Rings and they will last for MONTHS instead of HOURS. IN MANY PLANTS THEY ARE GIVING OVER 100,000 SHOTS PER SET. (Names supplied upon request). They are made of cast iron, dieloy cast iron or hardened steel especially for die casting machines or for casting zinc parts. They will save you money — write for details.

for LONG LIFE use AUTO-DIESEL TWO or THREE PIECE Plunger Segment Rings

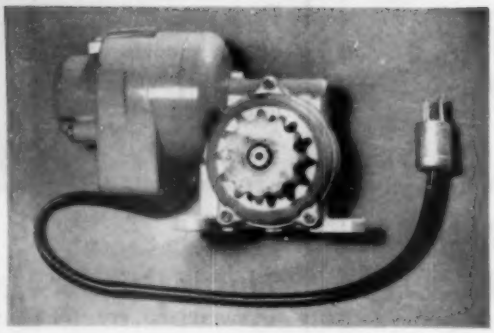
Auto-Diesel can supply 2 or 3 piece Plunger Segment Rings. They will give you LONG LIFE — reduce down time and expensive repairs. Made of high grade wear resisting iron in sizes from 1½" to 4" by ⅞" — especially for hot chamber die casting machines.

Write for Details

THE AUTO-DIESEL PISTON RING CO.
3135 Superior Avenue • Cleveland 14, Ohio
"RINGS and SHAPES Since 1921"

ZINC AND ALUMINUM DIE CASTING
by NELSON METAL PRODUCTS, INC.

DIE ENGINEERING
PRODUCT DESIGN
MODERN FACILITIES



AMI Incorporated, leading manufacturers of Juke Boxes, chose five separate Die Castings in the above assembly for quality and savings due to close tolerances obtained without costly machining or special tooling.

"QUALITY—DELIVERY—PRICE"
Nelson metal products, inc.
510 32nd St., S.E. GRAND RAPIDS 8, MICHIGAN

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IRON CASTERS
continued from page 64

characteristics and size change when used in our standard wheel mix. Nine iron powders were recently tested in our 2½" wheel and gave the results indicated in Table 3.

Some of these iron powders are new on the market, others are old reliables. The breaking strength is determined by loading the wheels between two plates in a Tinius Olson testing machine until failure occurs. This is a very easy and accurate method for evaluating iron powders that are submitted to us for our iron wheels. The loss of weight during sintering includes the stearate addition as well as loss of weight due to oxide reduction.

Design Changes

You will note in the picture of our wheels that we have a design change between the 2" and 2½" wheel. The cored holes in the 2½" and 3" wheels are there for the express purpose of reducing pressure area to keep this important factor in line with our pressing equipment.

The tools that we use to produce our wheels are no different than for any other powder metal part. We use carbide dies on most of the wheels. On the 2½" and 3" wheels, the core rods which make the tread holes are rather expensive because of their shape, but this design is appealing to the eye and is an aid in sales, as well as reducing the pressing area.

Our problems on these wheels and the future of powder metal wheels in the caster industry are exactly the same as the problems faced by the entire powder metal industry. We must have cheap, easily pressed iron powders to compete and to continue to compete with cast iron. We need to develop better tooling and presses, which will produce parts with less set up time and smaller repair costs. Our company is in powder metallurgy because it is their belief that these problems will be worked out and that the future will show an increasing market for high-quality powder metal wheels in casters of many types.

Co.; R. J. Wilcox, Michigan Steel Casting Co.; and Charles Schwartz, Misco Precision Casting Co., Div. of Iowa-Michigan Corp.

Dimensional Tolerances Committee — chairman, E. G. Chapman, Misco Precision Casting Co.; W. C. Jenkins, Casting Engineers, Inc.; R. C. Kramer, Thompson Products, Inc.; J. Stannard, Pratt & Whitney Div., The Niles-Bement-Pond Co.; R. Schwartzwaller, Wright Aeronautical Div., Curtiss-Wright Corp.; and J. Levine, Investment Casting Co.

Administrative Committees — chairman Vincent S. Lazzara, Casting Engineers, Inc.

ICI PROJECTS
continued from page 100

energies to wax, plastics and low melting metals considering such factors as volumetric change, penetration, melting points, ash content, viscosity, color, toxity, contaminants and packaging.

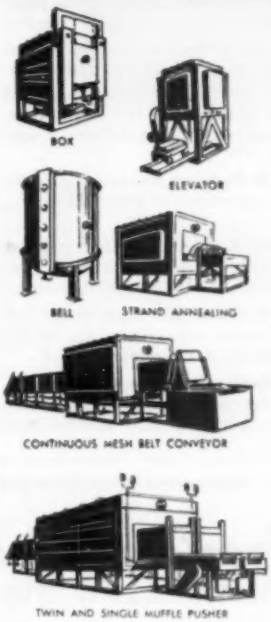
The second group will work with ferrous and non-ferrous groups in determining thermal curves, consistency, compression strength, setting temperatures, contaminants. Study of the latter group will be with binders of phosphates and ethyl silicates and refractories' screen analysis, pyrometric cone equivalents, calcination, chemical analysis, packing characteristics and packaging.

Members of these committees are C. W. Schwartz, Misco Precision Casting Company; Paul Solomon, Yates Dental Manufacturing Company; A. Aufhauser, Industrial Raw Materials Corporation; Harold G. Deters, Anderson Laboratories, Inc.; John J. Jesmont, Crucible Steel Company of America; Y. Pessel, Centrifugal Casting Company; Ray Reuter, National Aluminate Corporation; H. Lee Scott, Scott Casting Manufacturing Company; C. H. Watts, Pre-Vest, Inc.; T. E. Moore, Ransom & Randolph; Karl K. Breit, A. P. Green Firebrick Company.

A proposal for a test bar for super alloys has been submitted for approval by the Institute by the Physical and Non-Destructive Testing Committee. B. W. Duncan, Alloy Precision Casting Company, committee chairman, reported that the work on developing recommended test bars for the industry should be completed and final results presented to the November ICI meeting in Detroit.

The test bars developed by the committee and approved by the Institute membership will be submitted for approval and adoption as ASTM Standards.

AN OFFER OF HELP WITH YOUR HEAT PROCESSING PROBLEMS



WRITE FOR YOUR PERSONAL COPY

of new Pictorial Review of Harper Specially Designed Furnaces

For

Continuous Brazing
Bright Annealing
Sintering Powder Metals
High Speed Steel Heat Treating
Billet and Bar Heating
Annealing
Melting in Crucible
Forging
General Heat Treating

• **HERE AT HARPER,** the case history of your installation is written *before* you place your order!

The men of Harper believe in and work on this principle—you get the best results at lowest cost with high temperature electric furnaces specially designed and built to fit your products.

Isn't that better than trying to adapt your work to the furnaces? We call it "The Harper Way" and it works!

You need feel no hesitancy in leaning on Harper specialized *but broad* experience in developing electric furnaces for processing today's new metals and alloys—with or without special atmospheres.

The sketches show just a few types of Harper furnaces that are helping manufacturers gain a competitive edge through advanced design, volume production and lower costs.

Your request for a discussion is bound to spark-plug some worthwhile sharing of up-to-date thinking.

P.S. *You will not find us "high pressure".*

Furnace Builders Harper *for over 30 Years*

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Representatives in Principal Cities

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PRODUCTION PROBLEM ?

Z&H solved this one for Tec Welding Corporation . . .

is yours tougher?

PROBLEM:

Three screw machine parts would have to be fabricated and drilled after assembly for this water jacket. This piece would be impractical as a machined fabrication. Tolerance requirements: ± .002 to ½". Metal specified: Beryllium 275C (needed for conductivity).

SOLUTION:

Precision investment cast as a single unit, producing sounder casting at one-third of the cost of fabrication.

Z & H specializes in precision investment casting. Will give 3-week sample delivery. Compact organization can give prompt quotations, speedy delivery, competitive prices.

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PEEKSKILL • NEW YORK

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NAMES IN THE NEWS

continued from page 34

tory will supervise the laboratory phase of the company's sales engineering program from Port Huron, Mich.

J. O. Slaybaugh has been appointed division manager of *The Diversey Corp.* for the Cleveland, Ohio div.

Jack F. Anschuetz has been appointed sales manager for Hamilton presses at the Hamilton, Ohio plant of *Baldwin-Lima-Hamilton Corp.*

Arthur H. Luchs has been appointed vice president of *Dickey Industries.*

Robert Duffy has been appointed district manager of the Milwaukee, Wis. territory for *Lindberg Engineering Co.*

Curtis B. Hoffman has been appointed vice-president of *Brush Electronics Co.*

Hartwell & Co. has been appointed exclusive representative in the southwest for *Adams Carbide Corp.*

Glenn F. Ihrig has been appointed general sales manager of the *Wellman Bronze & Aluminum Co.*

W. F. Krahl was recently appointed sales representative for Illinois and Wisconsin by *Precision Metalsmiths.*

The *Prex Corp.* has announced the election of several new officers: **Robert W. Stoddard** as chairman of the board, **John L. Sekowski** as vice president and general manager, **Paul B. Prough** as vice president, **Larry E. Murphy** as treasurer, **Edward W. Bettke** as comptroller and **John P. Roche** as secretary.

Robert H. Kaltenhauser, John E. Mosser, Jr. and **David L. Raymer** have been appointed research metallurgists by *Allegheny Ludlum Steel Corp.*

Walter J. Bemb has been elected vice president for customer relations of *Aluminum Industries, Inc.*

The *Pangborn Corp.* has increased the board of directors from five to seven members. The newly elected directors are: **Thomas B. Butler** and **Mrs. Helen R. Fisher.**

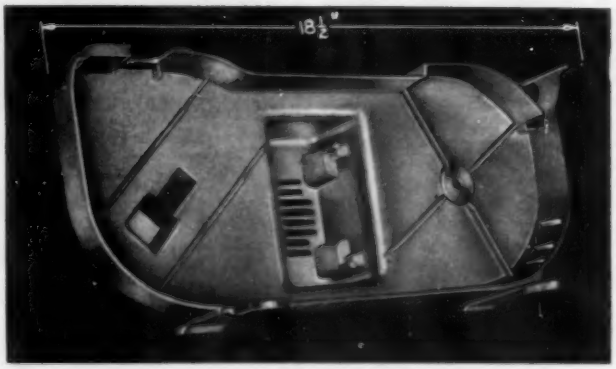
Howard H. Miller has been named as sales engineer in the east central area for *Engleberg Huller Co., Inc.*

H. E. Rittenhouse has been appointed chief engineer of *Rockwell Mfg. Co.*, Pittsburgh, Pa. div.

Wallace S. Frank has been appointed supervisor of the process development unit, silicone products dept. of *General Electric Co.*

Albert G. Jacobs has been appointed special representative for tool bit and drill rod sales relations of *Vanadium-Alloys Steel Co.*

Precision in our Die Castings



makes your product the best.

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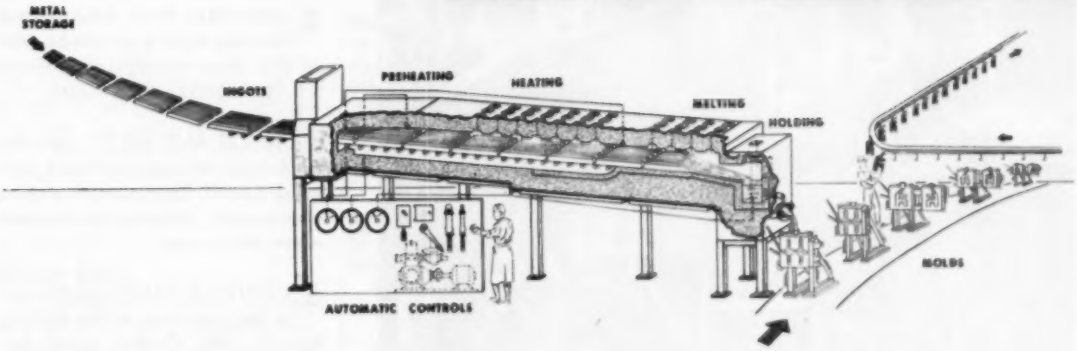
TECHNICAL REPORT

1. POURING SPOUT can be seen at far right, with sloping furnace chamber extending upward to the left. Radiant burners in the roof provide heat for continuous melting.

2. FROM COLD INGOT to poured mold in half-hour span is the rate at which this furnace, shown schematically at the right, produces metal ready for casting.



Are We Headed Toward Mechanized Foundries? Here Are . . .

Continuous Melting And Automatic Pouring

A NEW furnace, designed and built by Monarch Aluminum Mfg. Co. in cooperation with the Selas Corp. of America, makes possible the continuous melting and casting of aluminum. This development may bring about automation of the foundry, particularly permanent mold and die casting.

Not only does this furnace provide a step toward complete mechanization, but it reduces metal melting costs and provides improved working conditions.

Figure 1 shows one of three furnaces now installed and in continual production at Monarch; Figure 2 shows a schematic view of a typical installation.

The basic concept of the furnace is, of course, the melting of metal at the same rate as it is withdrawn for casting. To achieve this end, requires the melting of relatively small amounts of metal in a very short time interval. However, the melting has to be done in such a manner that complete alloying can take place prior to pouring and to avoid large holding pots with their associated high oxide and high dissolved gas contents the melting must be done very quickly and the molten metal withdrawn from the oxide skin that is always present on aluminum. This skin must be trapped where it can be removed without mixing it into the metal bath.

As can be seen from the illustrations, the furnace is an inclined tube with a relatively small rectangular cross section and a slope of about two inches per foot. This slope is adequate to provide continuous drainage of the liquid aluminum but not sufficient to allow the ingots to slide.

Starting at the upper, or charging, end of the furnace, a pusher mechanism is provided

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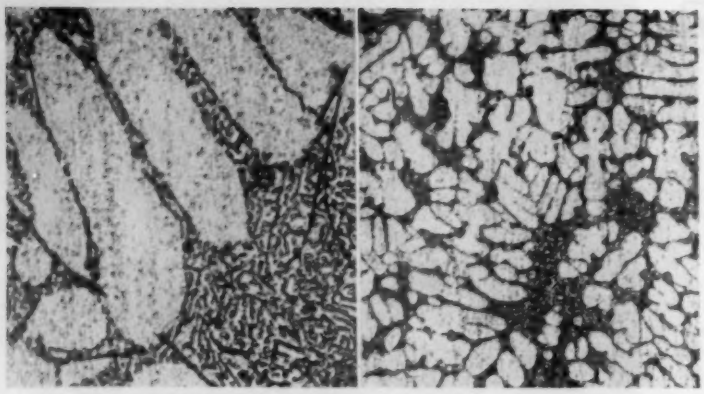

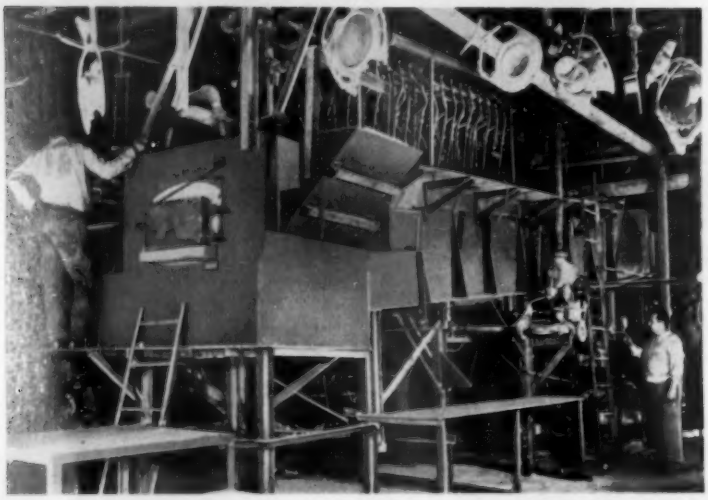

3. UNIFORM FINE GRAIN and freedom from dross can be seen in the photo-micrographs, above left. (Left, 500X; right, 100X)

4. INGOT AND ALLOY enter the furnace at upper end via a conveyor system. Entry point is shown, above right. Alloying takes place within the furnace.

5. CONTROL PANEL can be seen in this rear view of the melting furnace, left. Control panel appears in lower right hand corner of the picture.

Furnace Operating Characteristics: Time, Costs, Metal Quality

that feeds from one to five ingots per cycle into the furnace. Subsequent charges, about one every five minutes, push the ingots down through the inclined furnace while the hot combustion gases pass up and are exhausted above the metal entry. This counter-current flow of ingots and gases effectively preheats the charge and robs the exhaust gas of the majority of its sensible heat. Actual temperature measurements taken at the exhaust end of the furnace show a stack temperature of only 300F. This stack temperature, incidentally, is used as a furnace operation check and any marked rise in temperature above about 300F indicates malfunctioning of the furnace.

The first two-thirds of the furnace length is given over to preheating the charge. The final third melts the metal and holds it at the desired pouring temperature. In the particular units now in operation, sixty Selas Duradiant burners are employed in four banks of fifteen burners per bank. This arrangement gives a radiant roof where the temperatures can be regulated to give the melting and holding conditions desired.

Of the three furnaces presently installed, capacities are about 1500, 1800 and 2400 pounds of metal poured per hour. After about one and one-half years experience with these furnaces on production lines certain operational data are available.

Heat Up Time

From a cold start metal can be poured in from 2 to 3 hours. This compares with some 12 to 15 hours for a standard reverberatory furnace.

Weight Of Metal In Process

With a pouring rate of 2000 pounds of metal per hour, only 1000 pounds are in process at any one time in the new furnace as compared with about 15000 lbs. of molten metal required in the older types of furnaces used.

Melting Costs

Based on the gas required to melt a pound of metal, the new

furnace shows a gas consumption of 1.1 cubic feet per pound of metal melted as against the best that a reverberatory furnace will do of about 1.7 cubic feet of gas per pound of metal. These figures do not include heat up time and when these figures are included the consumptions are 1.9 cubic feet for the new furnace and 3.0 cubic feet for the older furnaces.

Maintenance

While comparable figures are not available, the new furnace is known to have drastically lower maintenance costs than the older types. For example, in the period of use so far, there has not been a single furnace bottom burned out. Such repairs as are necessary have generally been done while the furnace is hot with little interruption of service. When necessary, the furnace can be completely drained for a shut down and only about 300 to 700 pounds of metal will have to be poured off. In most cases this metal is processed into castings.

Melting Rates

As noted, the normal melting rate is about 30 minutes for the complete cycle from ingot to poured casting. This rate can be varied and the furnaces have been operated as low as 60 percent of rated capacity. Both rate of charging and temperature in the melting zone will influence the rate of molten metal production.

Operating Conditions

Because of the relatively small amount of molten metal that is in process at any time, heat dissipation is held down. By exhausting the hot gases into a stack and using a door at the charging end there is little heat wasted at that end. On the casting floor the absence of a large dip-out eliminates that source of heat. Using permanent molds on a continuous casting arrangement requires that the molds be held at about 500 F, but because the casting floor is considerably below the furnace level, it is simple to arrange for adequate ventilation to give the best possible working conditions.

Continuous Casting

Because the rate of flow of molten metal can be accurately controlled, it is now possible to

Continued on next page

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NEW!

HIGH SPEED
A.B.C. DIE CASTING
MACHINE

Free Cycles Over 1000 Shots Per Hour

Here's the new A·B·C high speed, low cost die casting machine which eliminates costly production of small die castings on large die casting machines. Air operated, the machine produces small non-porous lead, tin and zinc alloy precision die castings up to 1½ lbs. The A·B·C is economical to operate and easy to set up. Its lightning production speeds makes single cavity molds practical and profitable.

STANDARD EQUIPMENT INCLUDES:
- 4 TIE BARS
- AUTOMATIC TIMING
- CALIBRATED TEMPERATURE GAS CONTROL
- GAS BURNERS
- DIE BLOCKS
- AIR REGULATOR
- FILTER
- OILER
- SAFETY SHOT INTERLOCK

Write today for engineering data and prices. Ask for bulletin A-10.

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Has Been Producing
Excellent ZINC
DIE CASTINGS
Since 1903

We are a bit proud of the fact that numerous of our customers are in the third generation.

"Teddy" Roosevelt was president of the United States when STROH first produced zinc die castings. The fact that we still serve many of these early accounts, we believe, speaks volumes for the excellence of our product.

Inquiries Invited:

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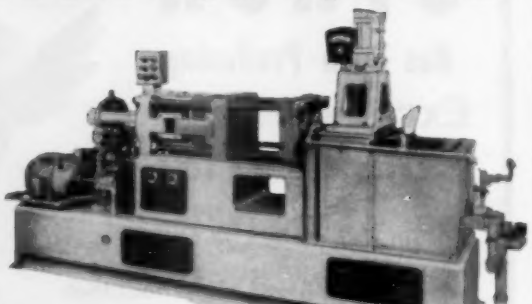
HERE IT IS! *A Low Cost-High Speed Die Casting Machine*
Over 1100 Free Cycles per Hour

UP TO
2½lb.
SHOT CAPACITY



Die Casters —
Speed Up Your Production—Increase Your Profits!

At an investment so low that will amaze you — you can set up this compact unit in your shop and run high grade castings, up to 2½ lbs. at high speeds.

Not only is the original cost extremely low, but operating costs are so low that the machine will soon pay for itself. Actual tests operating 8 hours a day, 5 days a week, show total cost of gas and electricity of ONLY 17 CENTS PER HOUR!

All models of American Die Casting Machines are easy to operate and all contain features and workmanship of larger and much costlier machines.

Other outstanding features include — all steel welded construction — 80 ton locking pressure — automatic electric cycling at high speed — 17-¾" x 17-¾" die platens — 6½" die stroke — highest grade controls and valves mounted for easy maintenance and accessibility — a complete package with self contained unit.

Available in Air or Hydraulically operated plunger goose-neck type for zinc, tin or lead, or, cold chamber type for aluminum, brass and magnesium.

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AMERICAN DIE CASTING MACHINERY CO.
1516-R Thomas St. Chicago 22, Ill. PHONE: Armitage 6-3334

For more information circle No. 12 on the Reader Service Card

set up a permanent mold and die casting on a continuous arrangement. By properly indexing the placement of molds, pouring becomes automatic so long as all of the molds are the same, or if different, the weight of metal poured per mold should not vary by more than one pound.

Metal Quality

The smaller amount of molten metal that is held in the furnace and the method of removing the oxide skin insures a much cleaner metal at the spout and also much lower dissolved gas content. The quality of the castings produced from metal melted in this furnace is shown in Figure 3.

How wide an application this furnace will have is still to be determined. As noted, the furnaces are in continuous production at Monarch, who conceived and did much of the development work on the furnace. Company plans call for the replacement of all reverberatory furnaces in the plant by these new furnaces as rapidly as obsolescence of present equipment will allow.

Because of the nature of these continuous melting furnaces they must be designed and built specifically for every job. Design, construction and installation of commercial units for the foundry industry will be handled by Selas.

Change Of Alloy

When a change of alloy is required it is possible to accomplish the shift with little or no down time. By anticipating when the change will take place the entire furnace can be poured off and the new alloy started through so that by the time the molds have been changed the new alloy is ready for pouring.

Alloying within the furnace is quite simple. The correct solid charge to give the alloy-composition desired enters the furnace in the usual manner. By the time, one-half hour later, this metal is poured, complete alloying has taken place.

OFFERS NICKEL SALTS

Federated Metals Division, American Smelting and Refining Company, is now offering for the first time superior quality nickel salts for nickel plating. These salts complement the full line of plating anodes that Federated currently furnishes.

MAGNESIUM ASSOCIATION TO MEET IN NEW YORK

Papers devoted to two newly developed applications of magnesium will highlight the 11th Fall Meeting of The Magnesium Association at the Hotel Biltmore, New York City this year. Meeting days are Monday and Tuesday October 31 and November 1.

Experiences with magnesium in luggage manufacture and use of the metal as tooling plate will be featured, in a schedule of papers covering a range of applications from hand tools to radar.

In announcing completion of tentative programming, association president Daniel T. Wellman, president of Wellman Bronze and Aluminum Company, Cleveland reports that this year's papers will be presented in all but one or two instances by production personnel from firms making commercial use of magnesium.

Complete program data and advance registration information is available from The Magnesium Association, 122 East 42nd Street, New York 1, N. Y. Details and arrangements for the meeting are under the direction of Jerry Singleton, executive secretary of the Association.

For more information circle No. 62 on the Reader Service Card

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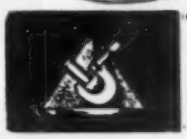
precision made from exclusively formulated non-ferrous Sintroloy and Ductiloy are molded to close tolerances, thereby eliminating machining of intricate shape and high scrap loss.

Perhaps we may be able to help you solve specific parts problems. Get in touch with National Molded today for prompt attention.

Write today for detailed information and free literature on cost-saving standard bearings which are available from stock.



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Cleaner Product and less tool wear are the reasons why Fiske Lubricants are used in progressive metal working plants that produce the highest types of aluminum products.

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General Smelting Company

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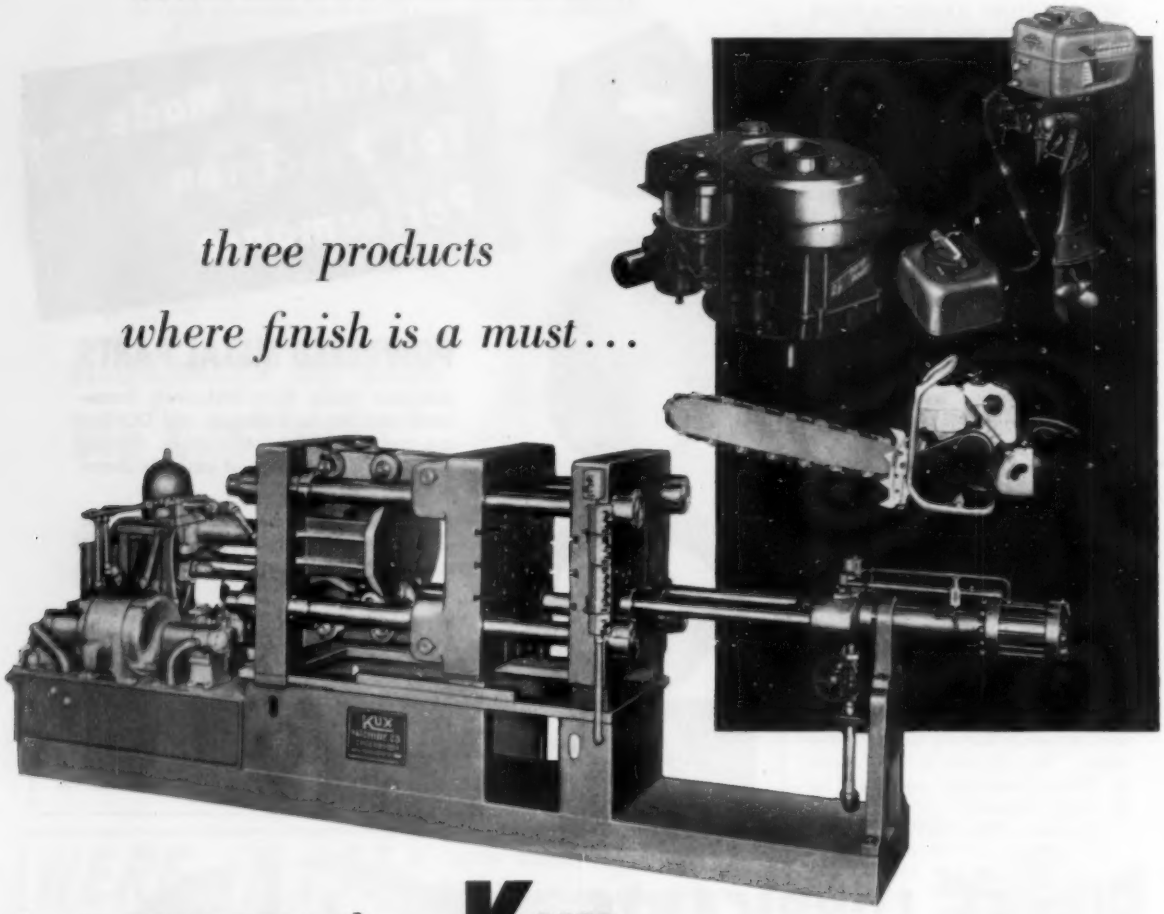
three products

where finish is a must...



so **CLINTON** *chose* **KUX**

DIE CASTING MACHINES

to get hardware finish quality castings

Every sales manager has told his production department at one time or another, "The product's fine, but you've got to dress it up."

At which time the production man starts talking about increased costs.

But many manufacturers have found they can "dress up" their products, and at the same time, *lower* manufacturing costs.

The Clinton Machine Company, Clinton, Michigan, did just that. "We use Kux Die Casting Machines in the manufacture of approximately 60% of the component parts of our Clinton engines, chain-saws and outboards.

"We chose Kux because our standards require machines that give us a dense, hardware quality finish with castings to close tolerances. The efficiency and low maintenance costs of Kux Machines have cut our production costs sharply, too," says R. E. Porter of Clinton Machine.

KUX produces a full range of modern die casting machines that require only the touch of an electric button to put them automatically through a complete casting cycle at high production speeds. Kux engineers will be glad to show you how die casting machines can serve you, or write for an illustrated catalog.

MODEL HP 37 ILLUSTRATED

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NEWS OF INDUSTRY AND ASSOCIATIONS

JOHN C. COONLEY ELECTED PRESIDENT OF H-P-M

At a special meeting of the board of directors of The Hydraulic Press Manufacturing Company, Mt. Gilead, Ohio, July 26, John C. Coonley of Princeton, Mass., was elected president and a member of the board. In assuming the presidency Mr. Coonley fills a vacancy created last April.

John C. Coonley

Until January of this year, Mr. Coonley was general manager of the Valve Division of A. C. F. Industries, of Detroit, a position which he assumed in 1950. He was assistant works manager of the Heald Machine Company of Worcester, Mass., from 1941 until 1950, and served as assistant to the president of the Lucas Machine Tool Company of Cleveland during 1940 and 1941. Prior to this he was for 11 years associated with the Walworth Company, Inc., of New York City in various positions, and was a sales engineer when he left the firm in 1940.

Mr. Coonley is a member of the American Society for Testing Materials, American Society for Metals, American Society of Tool Engineers, American Foundrymen's Society and the Engineering Society of Detroit.

FRANCIS J. STOKES DIES

Francis Joseph Stokes, 81, industrialist and naturalist, died August 1 at Germantown (Pa.) Hospital, after a brief illness.

In 1896, Mr. Stokes developed the Eureka pharmaceutical tabletting press, the first successful commercial machine for tabletting drugs at high speed. From this foundation grew a machinery-building business that now includes not only automatic pharmaceutical machinery but also high-vacuum processing equipment, plastics molding machinery, and powder metal presses, and employs some 900 people at 5500 Tabor Road, in northeastern Philadelphia.

Mr. Stokes was president of the Stokes company until 1948, when he became chairman of the board, holding this position until his death.

LITEMETAL DICAST EXPANDS PRODUCTION FACILITIES

A fifty percent expansion in capacity has been started by Litemetal Dicast, Inc. of Jackson, Michigan, die casters of aluminum and magnesium alloys. Construction of new building area has been started, according to a statement by Robert Cornell, vice president of the company.

Steady increase in the demand for aluminum die castings is reported by the company, who produce die castings on a jobbing basis. Greatest increase in sales has been in the larger size castings.

INVESTMENT CASTERS IN WEST NAME NEW OFFICERS

New officers of the four-year-old Investment Casters Society, with headquarters at 908 Venice Blvd., Los Angeles 15, Cal., have been elected. Heading the organization for 1955-56 are: Frank Taylor of Joseff, Inc., president; Jim Butterworth of Picco, Inc., vice president; and Dick Ells of the Dick Ells Co., secretary-treasurer.

Board of directors consists of: Pat Howerton of Duncan-Rohne Co., chairman, Myron Orbaugh of Bone Engineering, Lawrence Schwedes of Lawrence Laboratory, Mr. Taylor and Mr. Butterworth.

The West coast group now has 21 active and associate members.

ETHYL SILICATE PRICES CUT 2 TO 3½ CENTS

New lower prices for condensed ethyl silicate, ethyl silicate 40, and tetraethyl orthosilicate have just been announced by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. The new prices represent reductions of two to 3½ cents per pound.

The new prices are:

Eastern Territory (East of Idaho, Utah, and Arizona)

	Tank Car Lots	*Carload Lots in Drums*	*Less Carload Lots in Drums*
Ethyl Silicate, Condensed	35.5¢ per lb.	37.5¢ per lb.	38.5¢ per lb.
Ethyl Silicate 40	47.0¢ per lb.	49.0¢ per lb.	50.0¢ per lb.
Tetraethyl Orthosilicate	—	61.5¢ per lb.	62.5¢ per lb.

All shipments of 55-gallon drums or more are f.o.b. delivery point of rail carrier nearest point of destination. Prices are one cent per pound higher in the Western States.

Ethyl Silicate is widely known as the outstanding mold binder for precision investment casting.

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A pioneer in the die casting art, *Milwaukee* has long been a recognized leader in supplying *Die Castings as Specified* to all types of industry for all types of products from small precision instruments to massive heavy duty machinery. That is why you can entrust *Milwaukee* to produce die cast parts to your most exacting specifications — not only in dimensions — but in contour, weight, strength, pressure resistance, wear resistance, finish and other vital characteristics.

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Established 1909

ALCALOY NAMES GENERAL SALES MANAGER

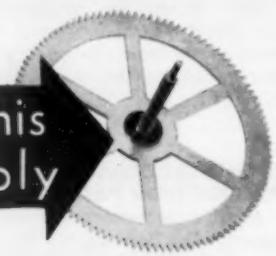
The appointment of R. A. Entringer as general sales manager of Alcaloy, Inc., at Trenton, N.J., is announced by T. S. Roderick, general manager.

Mr. Entringer holds a degree in chemical engineering from Marquette University, where he was graduated in 1941. His industrial background includes employment in the metallurgical departments of Ampco Metal, Inc., Milwaukee, Wisconsin; Ladish Drop Forge Company, Cudahy, Wisconsin; and the Cleveland Forging Division of the Aluminum Company of America, at Cleveland, Ohio.

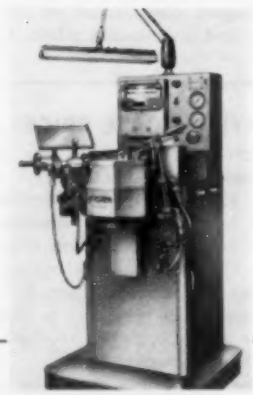
He has been associated in a sales capacity with the Claude S. Gordon Company of Ohio and the J. T. Baker Chemical Company of Phillipsburg, New Jersey. For a time, he acted as manufacturer's representative in the northern Ohio territory, for various companies including Alcaloy, Inc.

Alcaloy, Inc., which is a nonferrous, permanent-mold foundry making component parts for industry and a standard line of spark-resistant safety tools is associated with Dickey Industries of Cleveland, Ohio.

SAVE 50%
and more, with this die cast assembly



Now you can apply the *precision* and *economy* of high-speed die casting to the *assembly* of your small parts. This gear and shaft assembly is just one example: position the parts, make the shot, and you have a precisely die cast hub, already trimmed. One meter manufacturer does this job on a Fisher No. 15 at a 500-per-hour rate with girl operators. Savings on this job: over 50% compared with staking the assembly. How many places on your production line could a Fisher die casting machine save assembly dollars? Send for Model No. 15 Data Sheet.



No. 15 takes only 30" x 30" floor space, weighs 900 lbs. Features: automatic injection; 350-800 pieces per hour rate; so safe that girl operators may be employed.

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3. savings of metal (retained free of dross)

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TWO APPOINTMENTS MADE BY PRESSCO CASTING

Two appointments have been announced by W. P. Hodgkins, president of Pressco Casting & Mfg. Corp. of Chesterton, Ind. Carl E. Rowe, formerly a consulting engineer in Milwaukee, Wisc., has been named vice president in charge of manufacturing, and William J. Brinkman has been named vice president in charge of engineering.

FINISHES FOR DIE CASTINGS
continued from page 68

zinc drawer pulls, knobs and other hardware items; Maytag has found it suitable for chromium plating steel shafts. Several companies in the hardware and allied fields are planning to introduce this process.

At least two major companies are now offering a new type of bright nickel bath which, in combination with the generally accepted bright copper underplate, help to reduce the amount of buffing and coloring needed, and prolong the life of the plated coating.

Gold plating has gained rapidly in popularity; most automobiles and many home appliances have some gold plated die castings. The small decorative nameplates, and other trim, on the modern car, very often have precious metal plating applied. The cost of this is not high and it adds a warmth not obtained by chromium. The combination of these two finishes (as on the 1956 Lincolns shown on page 47) makes a handsome and rich hood ornament, luggage compartment handle, etc.

Organic Coatings: New combinations of synthetic base materials have produced coatings for die castings with long service life, good gloss and resistance to fading, abrading, or deterioration.

Some paints are especially formulated to adhere to the "slick" surfaces of zinc or aluminum die castings without preliminary treatment, although the majority of business machine and home appliance die castings (as examples of large volume users of die castings) depend upon phosphate or chromate pretreatments to im-

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prove the paint bond and retard or prevent corrosion when the paint film becomes broken.

Hammered or wrinkle type finishes have gained in use because they completely mask surface

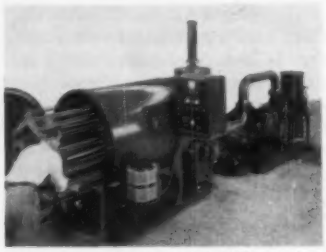

Photo: Consolidated Vacuum Corp.

VACUUM COATING equipment such as this compact unit is making bright metallic finishes on die castings economical.

blemishes such as flow marks, minor porosity or cold shuts.

One new paint on the market is water-reduced, and is said to eliminate the hazard and nuisance of conventional solvents. It can be applied to die cast surfaces to gain either glossy or matte finish, and is reported to provide good adhesion.

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▶ die castings

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The use of paint heaters to reduce the viscosity of paint without a high addition of thinners is also coming into great popularity, not only because it cuts down on the amount of thinner needed, but it allows better control of paint thickness, reduces running, permits shorter drying and baking cycles, and improves working conditions. Heat is also being applied more and more to prepare castings for painting.

With the trend toward more colors, and combinations of colors, there has been a great need for speeding up the process for painting the irregular contours of die castings. To meet the need, methods of applying electroformed paint spray masks automatically, and other auxiliary equipment for spraying, washing masks, wiping, etc., have multiplied the hourly output of die cast automotive trim, toys and other products that have one or more colors on selected surfaces.

Barrel Finishing: No single method of processing is more widely used for preparing die cast surfaces than is barrel finishing. A full range of mechanically-finished surfaces, ranging from coarse polishing and deburring to a high burnishing can be accomplished by barrel techniques.

The attractive part of this process has been the elimination of the most expensive factor on any production line: hand labor. Now, literally thousands of parts can be processed to a predetermined finish simultaneously.

Once restricted to small-to-medium sized die castings of a symmetrical shape and rounded contour, the scientific development of barrel finishing has resulted in equipment and materials that can finish almost any size or shape of piece.

Two particular trends are the increased use of barrels having racks inside the tumbling compartment. This allows the barrel finish of extra large castings, complete assemblies, odd-shaped pieces, or castings that would be warped or twisted by loose tumbling.

One beauty of barrel finishing is that, with one set of equipment, occupying a small amount of floor space, a wide range of finishes can be secured. It is used in almost every industry that has die cast parts in its products: for preplating, prepainting, cutting down, burnishing, coloring, deflashing, deburring and many other jobs.

Barrel methods have also found application for bulk electroplating of small die castings, eliminating the expense and work involved in preparing, coating and using plating racks. A great deal of handling is also saved.

Preparing the Castings: More time and money is spent preparing the casting, in many instances, than in the actual finish itself. Zinc and aluminum require protective treatments for many applications; characteristic parting lines and flash have to be removed; porosity may have to be sealed for hydraulic or aircraft castings; die lubricant, machining lubricant and other types of soil have to be removed to make surfaces chemically clean for plating; and contour blending is a common need.

Some of the newer materials and processes used here are the resin-bonded abrasive belts which are reported to have prolonged cutting life and greater resistance to loading. Newest coated abrasive and one which has yet to get its full field testing on

Continued next page

Are You Investigating Costs?

INVESTMENT CASTING MAY BE YOUR ANSWER...

This housing for a non-lubricating lift plug valve is cast in 4140 steel. It is annealed and normalized prior to machining and final heat treatment. If the part were made from bar stock or a forging, scrap losses would be very high and machining costs would be multiplied many times over that now needed to finish this 1½-pound investment casting.

If the rising costs of materials and labor have you concerned, you certainly ought to investigate investment castings. A good place to start your investigation is any part on which multiple machining operations are now required. Your re-evaluation will point out the ways that investment castings can save production dollars: close tolerances, fine surface finishes and soundness are assured. And complete quality control facilities are available to safeguard your savings.

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Finishes—cont.

die cast surfaces, is an abrasive mesh. Although it is not made up in belt form, it is used in disc and flat sheets, and a recently developed rotary head promises to be useful for contour work.

Most significant among the developments in use of abrasive belts is the use of lubricants and cutting oils with coated abrasives to minimize loading and extend belt life. Lubricant applicators for this purpose have only recently been announced.

Improvements which will speed washing and degreasing, also nearly universal operations at some stage of the processing of die castings, are largely in the mechanical field. Faster, larger and safer equipment has been developed to speed the washing and drying operations.

One company has introduced a degreaser which uses a solvent mixed with water that prevents fire hazard. As much as 40 percent solvent, with or without an emulsifier, is reported to be safely mixed with water for this purpose. Its use so far is mostly to remove machining soil and buffing residue.

Ultrasonic cleaning, still largely used for removal of soil from small, complex shapes that are difficult to clean by conventional techniques, holds much promise as a low cost, high production process.

Not new, but gaining in usage, is the application of chromate and phosphate types of surface treatments prior to painting, or as a final coating for protection. One company offers a process that chemically polishes the zinc die casting at the same time as it protects it. Another company makes a special conversion coating for aluminum that is said to make no significant change in the appearance of the metal surface while it is protecting it. Some phosphate treatments have been offered and are widely used designed specifically for zinc surfaces.

Choice of finishing methods has become an integral part of designing tomorrow's products and can no longer be left as an afterthought. The company which does not plan its complete finishing cycle at the time the product is originally developed is not only wasting money by failing to get the most efficient methods, but will also suffer in the marketplace.

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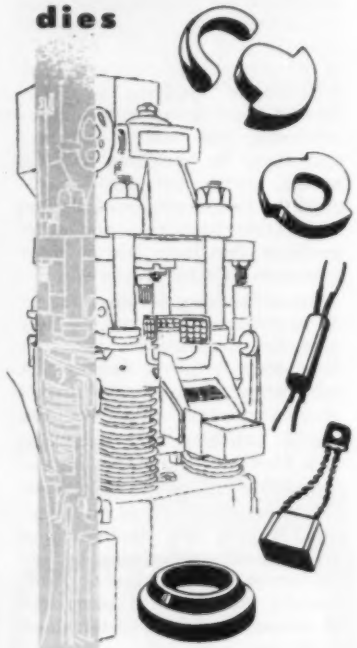

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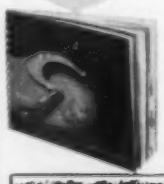

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Circle No. 22 on the Reader Service Card

INDEX OF ADVERTISERS

A

Abbott Ball Co. 90
A. B. C. Die Casting Machine Co. 111
Accurate Die Casting Co. 98
Acheson Colloids Co. 53
Ajax Engineering Co. 29
Alcoloy, Inc. 57
Allied Research Products, Inc. 77
Alloys & Chemicals Mfg. Co. 21
Almco Div., Queen Stove Works, Inc. 66
Aluminum Smelting & Refining Co. Cover II
American Die Casting Machinery Co. 112
American Zinc Sales Co. 10
Apex Smelting Co. Cover IV
Atlantic Chemicals & Metals Co. 116
Atols Tool & Mold Corp. 9
Auto-Diesel Piston Ring Co. 106

B

Barco Mfg. Co. 34
B-Mold Div., Buckeye Brass & Mfg. Co. 89
B & T Engineering & Sales Co. 12
Badger Die Casting Corp. 102
Belmont Smelting & Refining Works, Inc. 120

C

Cannon-Muskegon Corp. 18
Carbide & Carbon Chemicals Co. 31
Cast-Master, Inc. 1
Certified Alloys Co. Cover II
Cleveland Automatic Machine Co., The 17
Cleveland Tool & Die Co. 120
H. Cohn & Sons, Inc. 37
Crucible Manufacturers' Association 15

D

D. C. M. T. Sales Co. 85
Damon Tool & Engineering Co. 117
Detroit Electric Furnace Div.
Kuhlman Electric Co. 122
Detroit Mold Engineering Co. 121

E

Eastern Casting Corp., Div.
Eastern Malleable Iron Co., The 118
Eclipse Fuel Engineering Co. 25
Eclipse-Pioneer Div., Bendix Aviation Corp. 7
Enthone, Inc. 11
Exolon Co., The 76

F

Federal Die Casting Co. 100
Federated Metals Div.
American Smelting & Refining Co. 103
Wm. M. Fiore, Inc. 81
Fiske Bros. Refining Co. 113
Fisher Gauge Works, Ltd. 116

G

General Smelting Co. 113
Grav-i-Flo Corp. 94
R. W. Greeff & Co., Inc. 117
Gries Reproducer Corp. 14
Groov-Pin Corp. 87
Samuel Greenfield, Inc. 26

H

Hammond Machinery Builders, Inc. 92
Harper Electric Furnace Corp. 107
Haviland Products Co. 118
Heli-Coil Corp. 91
Henning Bros. & Smith, Inc. 19
Hoover Co., The Cover III
E. F. Houghton & Co. 93
Hydraulic Press Mfg. Co. 24

I

International Minerals & Metals Corp. 122
International Nickel Co., Inc., The 4
Investment Casting Co. 119

J

Johnson Machine & Press Corp. 89

K

Kuhlman Electric Co.
Detroit Electric Furnace Div. 122
Kux Machine Co. 114

L

Lake Erie Engineering Corp. 101
Lester-Phoenix, Inc. 32-33
Lindberg Engineering Co. 38
Litemetal Dicast, Inc. 96

M

Madison-Kipp Corp. 36
Midwest Machine Co., Inc. 104
Milwaukee Die Casting Co. 116
Minnesota Mining & Mfg. Co. 79
Monarch Aluminum Mfg. Co. 13
Montrose Chemical Co., Inc. 117
Monsanto Chemical Corp.
Organic Chemicals Div. 23

N

National Molded Products, Inc. 113
Neilson Chemical Co. 80
Nelson Metal Products, Inc. 106
Newark Die Mobbing & Casting Co. 97
New England Die Casting Co. 40

O

Oakite Products, Inc. 80
Ohio Precision Castings, Inc. 117

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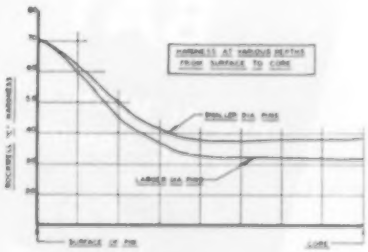

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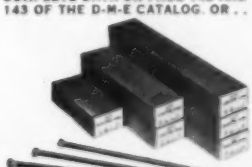

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LOS ANGELES 7, CAL. 3700 SOUTH MAIN STREET, ADAMS 3-8214

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For more information circle No. 26 on the Reader Service Card

ADVERTISERS' INDEX—cont.

P

Pangborn Corp. 86
Paramount Die Casting Co. 95
Parker White-Metal Co. 22
Permanent Mold Die Co., Inc. 27
Plastics Engineering Co. 5
Precision Castings Co. 62
Pressure Castings, Inc. 58
Procunier Safety Chuck Co. 81

R

Reed-Prentice Corp. 8
Rossborough Supply Co. 20
Roto-Finish Co. 88
Rutley Industries, Inc. 83

S

Geo. Sall Metals Co., Inc., The 28
G. W. Smith & Sons, Inc. 30
Frederic B. Stevens, Inc. 86
Stroh Die Moulded Castings Co. 111
Stroman Furnace & Engineering Co. 35

T

Tamms Industries, Inc. 118
Thompson Products, Inc.
Light Metals Div. 2
Titan Metal Mfg. Co. 60
E. Toman & Co. 105
Tri-State Die Casting Corp. 112
Twin City Die Casting Co. 6

U

United Chromium Div.
Metal & Thermit Corp. 69
Universal Die Casting Co. 99
Universal Tumbling Supply Co. 85

V

Vanadium-Alloys Steel Co. 84
Van Dorn Iron Works Co. 105

Z

Z & H Mfg. Co. 108

For more information circle No. 50 on the Reader Service Card

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Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND- Birlec, Ltd., Birmingham.

HUDSON BAY
SPECIAL HIGH GRADE
ZINC — 99.99%

International Minerals and Metals Corp.
11 Broadway
New York 4, N.Y.

One Fine Zinc For Die Casting

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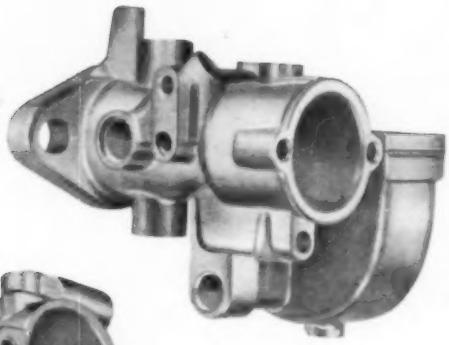
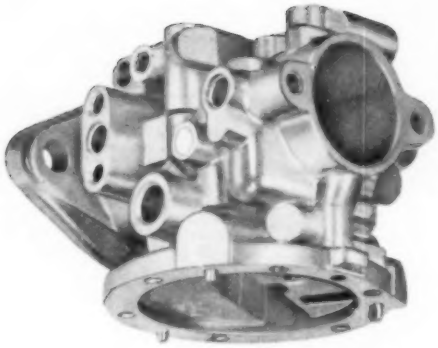
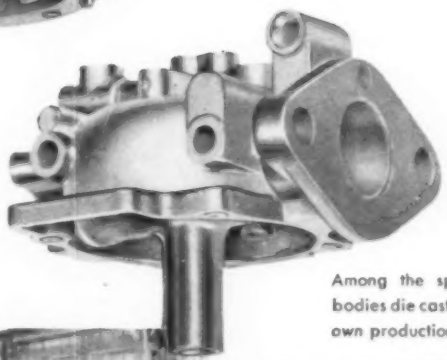






These complex die castings, produced by Hoover for the makers of the famous Tillotson Carburetors, are notable for their intricate coring and many close tolerances. They contain holes on all sides which must be perfectly aligned, and sections of the castings must be free from porosity to prevent leakage.

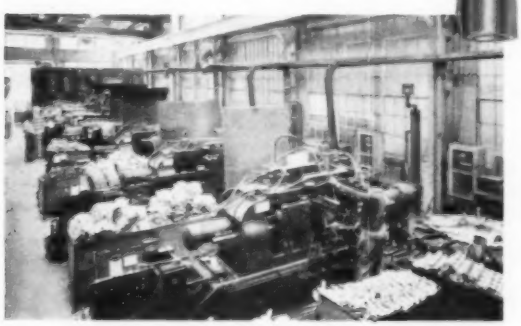
Tillotson Manufacturing Co. writes:

"DIE CASTINGS BY HOOVER

help us make a much better product at a much lower cost"

Among the specific advantages of having their carburetor bodies die cast by Hoover . . . advantages that may apply to your own production problems . . . The Tillotson Company points out:

- **Broader possibilities in engineering design.**
- **Saving in machining time due to large percentage of small holes cored to size and flat surfaces cast smooth.**
- **Saving of number of machines in production line.**
- **Longer tool life, fewer tools required.**
- **Cleaner to handle, less scrap in plant.**
- **Almost complete elimination of rejects.**
- **Smoother, neater appearance and strength with lightweight which have increased our sales tremendously.**



The Hoover Company's complete production facilities for promptly meeting your requirements include 8 zinc die-casting machines, and 27 aluminum die-casting machines carrying ratings up to 400 tons. Castings can be produced from the smallest practical size up to 12" x 12" area and 8 lbs. weight for aluminum and 7" x 10" and 5 lbs. for zinc.

THE HOOVER COMPANY, Die Casting Div., North Canton, Ohio

Get a bid from

HOOVER

Specialists in the fields of die castings since 1922

Write for file folder, "Die Castings." Shows how to step up production and cut costs. Shows their advantages, how they are made, how they should be designed, how they help you step up production and cut costs.

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APEX

Z-39

ALUMINUM
DIE CASTING
ALLOY

For High Fidelity Production . . . with Economy

● Dependable quality to exact specifications is a hallmark of Z-39 aluminum alloy, produced to high Apex standards and specially developed to give you uniform, trouble free production at lower cost. The excellent casting characteristics, mechanical properties and machinability of Z-39 meet every requirement for most jobs, produce quality castings as specified and gain you customer satisfaction, yet your savings can be material. For quality aluminum die casting with a cost conscious factor, you'll find Apex Z-39 the ideal alloy.

Send without obligation for information covering complete specifications and properties of Apex Z-39.

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APEX SMELTING COMPANY

CHICAGO CLEVELAND LOS ANGELES